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Pathology of Tumours of the Corpus Uteri.

Being the Ingleby Lectures for 1910 delivered in the University of Birmingham.

By R. F. C. LEITH,

Professor of Pathology and Bacteriology.
(From the Pathological Laboratory, The University of Birmingham.)

Continued from p. 400.

B.—MALIGNANT TUMOURS.

I.—SARCOMATOUS DEGENERATION IN FIBROIDS.

A certain proportion (probably under 2 per cent.) of fibroids, which come to operation, shows histological changes apparently indicative of malignancy. They are referred to by writers under various names, of which sarcomatous degeneration or transformation seems to be the most convenient. Their presence can never be determined with certainty until the tumour has been submitted to minute histological examination, though various signs, such as a rapid increase in the size of the tumour, a hæmorrhagic or offensive vaginal discharge, or onset of pain, may arouse suspicion in the mind of the clinician. The nature of these changes, their time, method of evolution and their cause are imperfectly known at the present time, and are deserving of further study. Sarcomata in general vary greatly in their degree of malignancy. In the absence of metastases, this rests upon their histological characters, and their behaviour to the tissues surrounding them. Of these, the vegetative nature or the grade of vegetative power of the cells is the most important. The comparative absence of matrix, the rudimentariness of the vessel walls, the tendency to central degenerative and necrotic changes, are useful additional signs, though merely the natural outcome of the first. Fibroids in which sarcomatous degeneration has occurred rarely give rise to metastases, and their degree of

malignancy must be determined in most cases by their histological characters.

But when recurrence does arise all doubt as to malignancy ceases. Figs. 41 to 44 are from a case of this kind. The patient was 55 years of age when she began to suffer from attacks of abdominal pain. The menopause, which occurred at the age of 47, was uneventful, and the health was good until the attacks of pain began. They continued during the next two years, becoming worse during the last three months. During the last six weeks of this time she noticed a swelling in the abdomen, which had steadily increased. She was then 57 years of age, and had the appearance of a fairly healthy, well-nourished woman. Mr. Hewetson, whom she consulted, found that she had a large, smooth and firm tumour of the uterus, extending upwards as high as the umbilicus, where it was of a soft and almost cystic consistence. He removed it by abdominal total hysterectomy, and the patient did well. She enjoyed good health for about six months, when she again began to suffer from pain, swelling and other symptoms. Mr. Hewetson then found that large and numerous secondary tumours had arisen, not only in the pelvis, but within the abdomen, and to these she presently succumbed. It seems certain therefore that the primary tumour was malignant, either from the start or from a later date. Examination of the tumour itself, a section of which is seen in Fig. 41, discloses a suspicious-looking softened area towards its upper part, whilst the rest, constituting about four-fifths of the whole, presents the appearances of an ordinary fibroid, except for some œdema and hyaline degeneration. This was corroborated under the microscope, for sections taken from different parts of this fibroid-looking tumour, presented the usual histological characters of an old fibroid of the ordinary kind, whereas the structure of the apical softened area was different. It consisted almost entirely of cells of varying size and shape, with little or no matrix and rudimentary blood vessels, as disclosed in the Figs. 42 to 44; in short, of the vegetative features, so characteristic of a sarcoma. The subsequent history of the case establishes the correctness of this interpretation. In such cases, a small minority, a sarcomatous reversion seems undoubted. But in the great majority it is not so clear, since recurrence does not arise, for it is rarer in the case of fibroids than in ordinary sarcomata, partly, no doubt, due to a low degree of malignancy, but partly also, to a difference in the anatomical relationships in the two cases.

Removal is wider and freer in the fibroid than in the sarcoma elsewhere. In the former the sarcomatous growth lies within the fibroid, a condition of *tumor in tumore*, as it were, which, in turn, lies more or less within the uterine wall. Hysterectomy, therefore, removes the sarcoma with a freedom which it is difficult to secure

in other situations. Moreover, removal is accomplished earlier than in the case of other sarcomata, operation being undertaken with the object of getting rid of the fibroid. A sarcomatous growth within it, though at times suspected beforehand, is only determined after a minute histological examination. It appear to occur in fewer cases than formerly, probably because removal of fibroid tumours is now undertaken both earlier and oftener. It gives rise to one or more patches often sufficiently distinctive to be picked out by the unaided eye. They vary in size and shape. The whorled and fasciculated appearance typical of the fibroid is replaced in them by a homogeneous or slightly granular white, pale grey, or yellow substance, likened sometimes to raw pork. Recent and old hæmorrhages appear within them. Their consistence is often firm, but is liable to become soft, spongy or cystic from the intervention of œdema, degeneration or necrosis. Pseudo-cysts and true cysts (both lymphangiectatic and telangiectatic) may be present. Hæmorrhagic foci, which at times reach a large size, are not uncommon.

These appearances, whilst they are suggestive, are not distinctive of malignancy, for closely similar changes are met with in some of the benign degenerative changes, and it is only when they are examined under the microscope that the difference in their character can be determined. Figs. 45 to 48. are taken from a case which serves to illustrate this difficulty. There was nothing in the clinical history of the case to suggest to the surgeon that the growth was not in its entirety an ordinary simple fibroid, but on sectioning the tumour (vide Fig. 45) he noticed one or two areas of a darker and more homogeneous appearance than the rest, and sent it to the writer for examination. These foci were found to be cellular in structure (vide Figs. 46 to 48), presenting the main histological characters of sarcomatous tissue. The subsequent history of this case could not, unfortunately, be obtained. The foci thus met with in fibroids are essentially cellular in structure with scanty intercellular substance and rudimentary blood vessels, recalling at once the appearances presented by a typical sarcoma. The cells vary so much in different cases and even in different parts of the same tumour, that it is difficult for any general description to give a satisfactory picture of them, and it will be found necessary to supplement the account herein given by a reference to the accompanying illustrations and to other cases published in gynæcological literature. The cells conform in many cases to two types—the one a non-striped muscle cell, and the other a connective-tissue cell type.

In the former or myoblast type, the cells are rather large, elongated in shape, with large oval or elliptical nuclei and a good deal of protoplasm. By close superimposition they form bundles which interlace in every direction. There is little or no intercellular substance, and the blood vessels are fairly numerous and capillary-

like. The general appearance is strikingly like a young actively growing part of a pure myoma, but the texture is opener in places, and the cells at times are large and may possess two nuclei (vide Figs. 49 and 50). Multinucleated cells or cell masses occur occasionally, but mitotic figures are rare. There may be several such cellular foci within a fibroid whose structure otherwise is constituted by old well-formed fibro-muscular tissue, into which the young growth seems to fade insensibly. In the other, or fibroblast type, there is greater irregularity in the size and shape of the cells. They are not superimposed upon one another, but are scattered, or at times clustered together, in a more or less plentiful granular or finely fibrillated matrix. Cells with more than one nuclei are common, and multinucleated cells or giant cell masses and mitotic figures are met with more frequently than in the myoblast type. The nuclei stain irregularly and often very deeply (vide Figs. 51 and 52). The blood vessels may have a single layer only of flattened cells or many layers of cells similar to, and contiguous with, those of the tumour; arranged at first concentrically around the lumen, they soon open out and straggle irregularly, becoming indistinguishable from the rest of the tumour cells. A study of these cells may disclose signs indicating that those nearest the lumen are younger than those further away, thus suggesting a genetic relationship between them, and a mode of origin and spread of the tumour growth; new blood vessels being first formed as buds from the pre-existing vessels, and thereafter that the new tumour cells are the offspring of the vegetative activity of some of the cells which form the walls of these new vessels, vide Fig. 53. When hyaline and other degenerative conversions supervene, they naturally affect the older parts of the growths, and may spare the younger cells immediately around the vessels. In this way the latter may present a picture of cellular cylinders running through a homogeneous matrix, a form of sarcoma often spoken of as a *cylindroma*. This is exemplified by the case from which Figs. 54 to 57 are taken. The uterus is the seat of a tumour growth, which has caused considerable, though uniform, enlargement of the organ, and has eaten its way through its lateral wall, forming an irregular tumour mass, which infiltrated the pelvic structures. The main body of the tumour (vide Fig. 55) had all the appearances of an ordinary old fibroid, but that portion of it which had eroded the uterine wall and formed the extrauterine growth was different. It presented (vide Figs. 56 and 57) the characters of a sarcoma of the cylindromatous type. The subsequent history of this case is not available, but there can be little doubt, from its histological characters and locally destructive nature, that it is a case of a fibroid which had taken on sarcomatous characters.

Whilst it is probably true that sarcoma in fibroids belongs either

to the myoblast or fibroblast type, or, as will presently be explained, to a still more primitive type of cell, it cannot be claimed that individual cases can be easily ascribed in practice to either of these types. There are indeed many cases in which the structure departs so little from that of a benign fibroid that some slight degree of malignancy is only a remote possibility, and others in which the departures are so much greater, that malignancy becomes correspondingly the more and more probable, until we can assert it with considerable assurance, when the vegetative characters of growth, associated with sarcomatous tissue generally, are present.

Figs. 58 and 59 are taken from a case of considerable interest in this relationship. The patient was a married woman, æt. 62, who had had ten children, the youngest being 20 years old. Her menopause occurred at the age of 53, and for three years afterwards she had no menstrual loss or other symptoms, but thereafter a menstrual discharge again appeared and continued every three weeks until a year ago, when it began to be more frequent and has occurred every few days for the last year. She first noticed a lump in the lower abdomen about a year ago, reaching as high as the umbilicus. She had become somewhat thinner, but had suffered no pain, and seemed a fairly healthy woman at the time she consulted Mr. Hewetson. He found that the tumour, which was connected with the uterus, now filled the whole abdomen. He therefore removed it by abdominal total hysterectomy, experiencing considerable difficulty owing to the extensive adhesions to the omentum, bowel and other structures. The mass weighed 26 lbs. There were several tumours, one, of moderate size, being submucous, and two or three smaller being interstitial, whilst the largest, measuring $12\frac{1}{2}$ inches by $10\frac{1}{2}$ inches by $8\frac{1}{2}$ inches, was subserous (vide Fig. 58). It was this large tumour which had formed the main part of the abdominal swelling and had increased in size during the last year with such alarming rapidity. Its appearances on section suggested a considerably degenerated fibroid rather than a sarcoma, but its fasciculation was indistinct. There were extensive œdema, hyaline degeneration and pseudo-cyst formation, but, in addition, just beneath the capsule, there were scattered areas of a pale, homogeneous, fleshy appearance, which were suggestive of a sarcomatous change. Under the microscope the main bulk of the tumour was shown to be a fibroid of some standing, which had undergone extensive degenerative changes, and it was no doubt largely to them that the recent rapid increase in size of the tumour was due; but the pale, fleshy areas showed a different structure (vide Fig. 59). They were distinctly young and actively growing centres, fibrocellular in structure, with many capillary blood vessels. There can be no doubt that their vegetative activity had contributed considerably to the recent rapid increase in the size of the tumour. Their nature was therefore of grave importance in the

prognosis. From their histological characters alone they cannot be unhesitatingly pronounced to be either benign or malignant. From a consideration of all the clinical and histological facts, which should always be done, a possibility of malignancy must be admitted, though the balance of evidence may be largely in favour of innocency. The patient was quite well at the time of writing, fully four months after the operation.

It is difficult to estimate the proportion in which these different degrees of malignancy occur in fibroids, owing, among other things, to the different interpretations of the histological features of individual cases, which it is possible for even competent authorities to hold. But when due allowance is made for doubtful cases, it is probable that the proportion of fibroids coming to operation, in which a sarcomatous change has occurred, is not far from 2 per cent. of the whole. The alterations in structure, which thus occur, are considerable. They give rise to growths of a cellular character such as are met with in sarcomata of a few weeks or months growth, and they are present within the substance of tumours, whose histological characters and clinical history suggest an existence often of years. They may make their appearance in fibroids, long after the menopause, in women of 60 years of age or more. When did these fibroids arise? Were they present before the menopause? Did they, after undergoing a certain degree of atrophy at that period, become quiescent until the sarcomatous growth developed within them, or did they arise themselves long after the menopause, and not so very long antecedent to the sarcomatous foci? It is difficult to answer these questions. It is the occurrence of bleeding or of a tumour undergoing increase in size, or of some other symptom which induces the surgeon to perform hysterectomy. He can seldom say from his knowledge of the clinical history that the fibroid has been present at or before the menopause. A history of trouble at or before that period has been given in some cases, making it probable that the fibroids were then existent. But the general anatomical and histological characters afford better evidence. They are similar to those of tumours which, there is good reason to believe, have been in existence for years. Such as it is, then, the evidence points to the sarcomatous foci arising as recent growths within very much older tumours, as a result of the vegetative activity in certain hypothetical cell rests, or of an anaplasia, or reversion to embryonic type of certain cells of the fibroid, not any of the fully formed muscle or fibrous tissue cells, for that does not seem possible, but of young, developing myoblasts or fibroblasts. Instead of proceeding to functionate as fully formed supporting tissue cells, after the fashion of ordinary young cells of this class, they revert to their earlier anatomical shapes, and expend their energies in vegetative reproduction. Not only do the two histological types find an explana-

tion on this hypothesis, the reversion affecting the young myoblast in the one case, and the young fibroblast in the other, but the aberrant instances which do not seem to belong to either type, may be referred to a still earlier mother cell, and be looked upon as the result of a reversion to the primitive undifferentiated cell from which the other two types spring. The fixing and staining solutions hitherto used by the pathologist in studying these embryonic foci have not been sufficiently selective to enable him to differentiate these types from one another with any degree of certainty. More success has followed the use of selective stains such as picrocarmine and picrofuchsin (Van Gieson's), than of non-selective stains such as eosin, but the greatest success of all has been obtained by Mallory by fixation in Zenker's fluid and staining with a modification of his aniline blue connective-tissue method. It enables the observer to trace the sarcomatous cells to their myoblastic or fibroblastic progenitors with apparent certainty, and has added the proof hitherto wanting to the opinion, which has long been maintained by pathologists, that the sarcomatous foci which appear in fibroids, might take their origin either in the muscular or the connective-tissue of these tumours. From an examination of the considerable number of cases which have come before him, the writer is inclined to believe that the myomatous origin and nature of such sarcomatous growths are more common than has hitherto been believed. Up to the present time only a small number of cases have been put on record, in which the myomatous nature and origin of both the primary sarcomatous focus and of such metastatic deposits as have occurred, have been clearly established. Another point which has appeared to him to evolve from this examination is the frequency with which the tumour cells could be traced to a development from the walls of the blood vessels, the mesothelium in some cases, the endothelium or perithelium in others, the entire tumour being the product of the endothelium, of the mesothelium, or of the perithelium of the vessels in each case. The first constitutes that form of sarcoma known as an *endothelioma*, the second a new type unknown in other situations, and the third that form known as *perithelioma*, in which the sarcomatous cells spring from the endothelium lining the lymph spaces of the outer coat. It is theoretically possible that the embryonic fibroblasts of the outer coat may, like those of the general substance of the growth, revert and constitute an ordinary round, spindle or irregular celled sarcoma, called, because of its position within the fibroid, a *myoma sarcomatodes*. The new type of sarcoma springing from the myoblasts of the middle coat of the vessels or from other myoblasts throughout the growth is conveniently spoken of as a *myosarcoma*. The name *mesothelioma*, which is naturally suggested by those of *endothelioma* and *perithelioma*, is not available for this variety, as it has already been appropriated for the malignant

growths springing from the endothelium of serous membranes, *e.g.*, the pleura, peritoneum, etc. We thus have a variety of sarcomatous growths arising within fibroids, the *endothelioma*, the *perithelioma*, the *myosarcoma*, and the *myoma sarcomatodes*, which may be the explanation of the relatively low degree of malignancy exhibited by most of these growths. Those originating in fibroblasts, though varying greatly in malignancy, show it in greatest degree, whilst the myosarcoma is the least malignant of all, the other two forms showing varying intermediate degrees.

The following case, from which Figs. 60 to 65 were taken, is an example of this endotheliomatous origin:—

The patient, a married nullipara, whose menopause had occurred two years before, consulted Dr. Wilson in 1903, when she was 44 years old, complaining of an increasing abdominal swelling and of incontinence of urine. She had an interesting previous history of tumour, having undergone two operations by different surgeons. At the first operation, five years previously, a cystic tumour, about the size of a fœtal head, was tapped per vaginam; at the second, 13 months later, a cystic tumour was attacked by abdominal section, but not removed owing to dense adhesions and the collapsed condition of the patient. Dr. Wilson, in 1903, found that the uterine tumour filled the pelvis and extended upwards to the umbilicus. He removed it along with the tubes and ovaries, though the operation was attended with much difficulty owing to the dense and extensive adhesions to the surrounding structures. The patient made an uninterrupted recovery, and was well when last heard of, six years after the operation. The uterus contained three tumours (vide Figs. 60 and 61); the largest, in its anterior wall, was almost entirely converted into a cyst (vide Fig. 62), whilst the other two were solid. The wall of the cyst contained a soft, shiny, homogeneous, waxy-looking material, and the solid tumours contained masses of the same substance between strands of fibro-muscular tissue of varying thickness. This substance has the vegetative histological characters of a sarcoma (vide Figs. 63, 64 and 65), invading, in the case of the two solid tumours at any rate, a fibroid; though in the case of the large cystic growth no fibroid tissue remains. This large cystic growth was probably the primary tumour, since no extirpation was undertaken at the previous operations; but, since no fibroid structure is present in it, the case cannot with certainty be classified under sarcomatous reversion in a fibroid tumour. Extensive telangiectatic and liquefying changes had occurred, and from the presence of other fibroids and a similar sarcomatous invasion of them, it seems probable that this is the interpretation of the case. From the characters of the cells and their relationship to the blood vessels (vide description of Fig. 64), it is probably an example of the peritheliomatous variety of sarcoma.

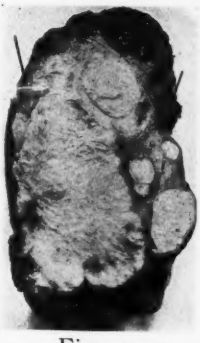
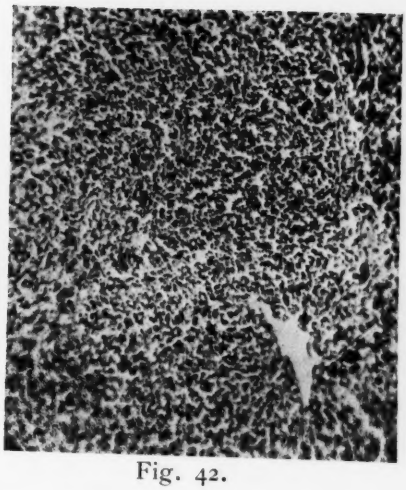


Fig. 41.



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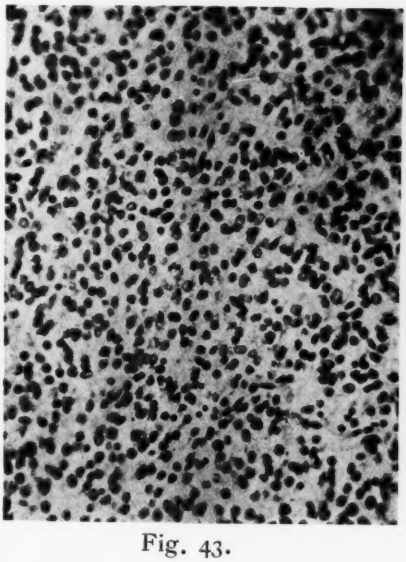

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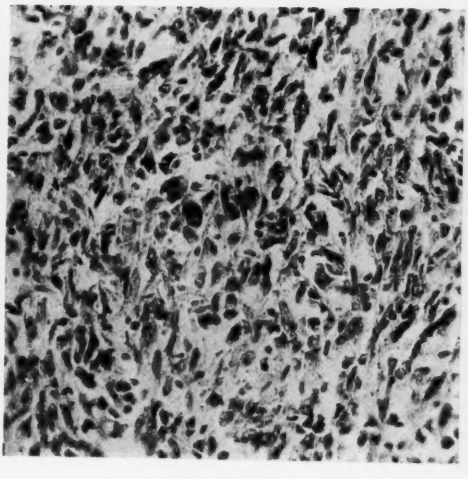

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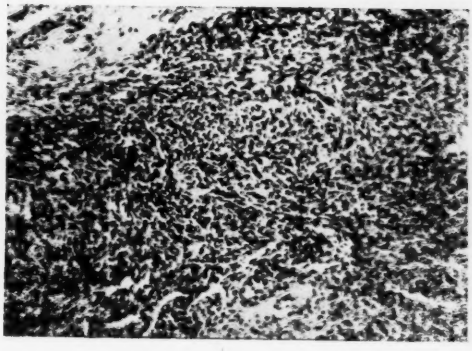

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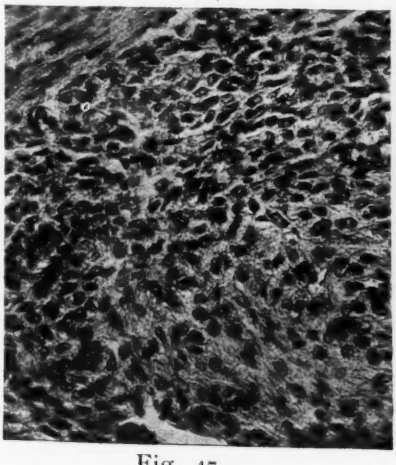

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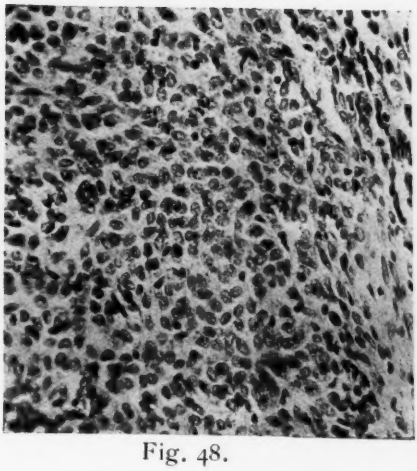

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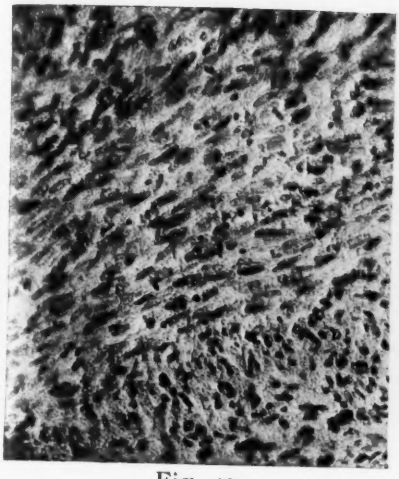

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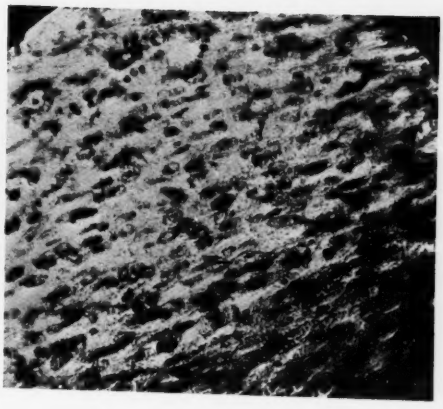

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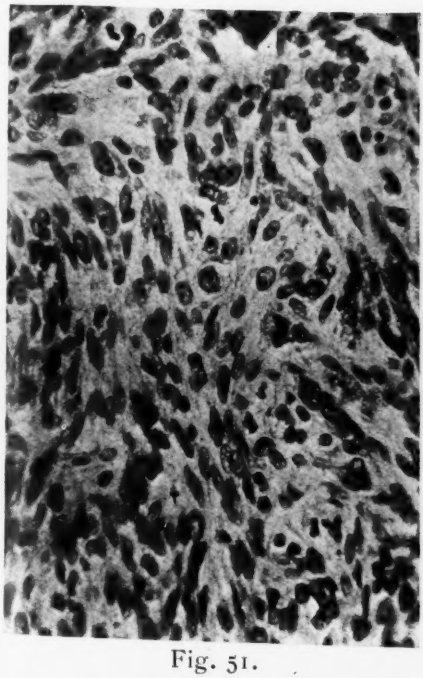

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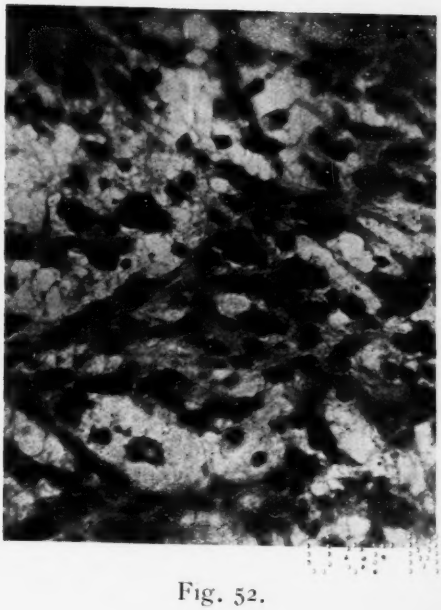

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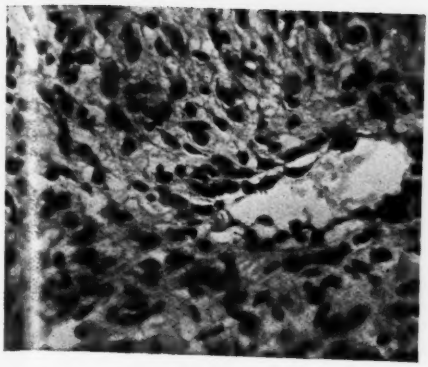

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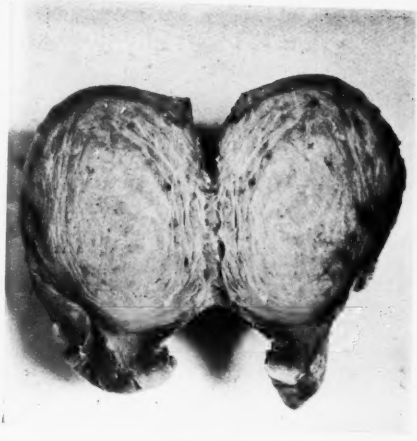

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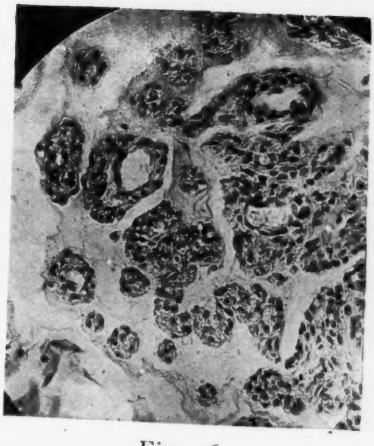

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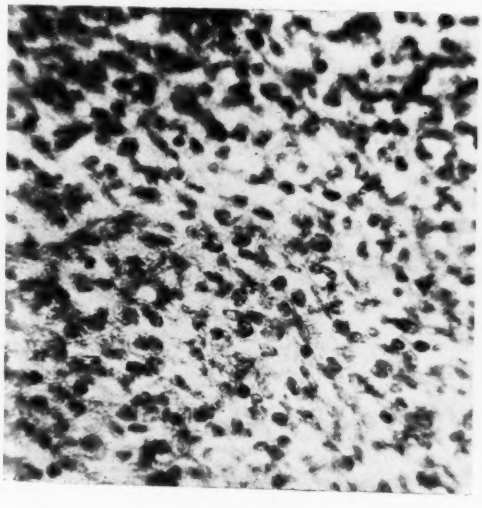

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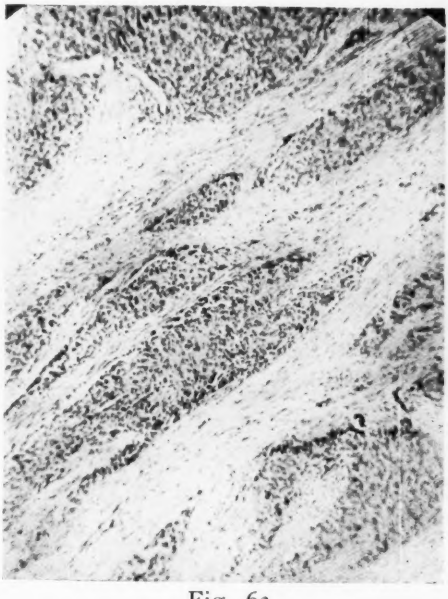

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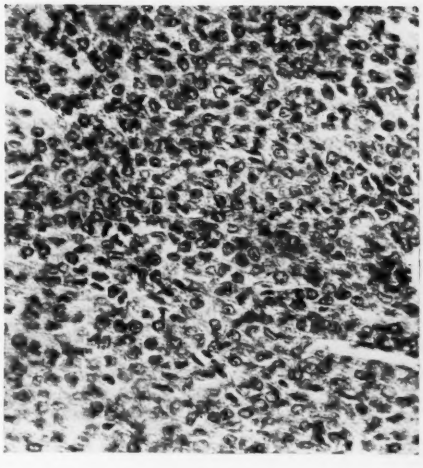

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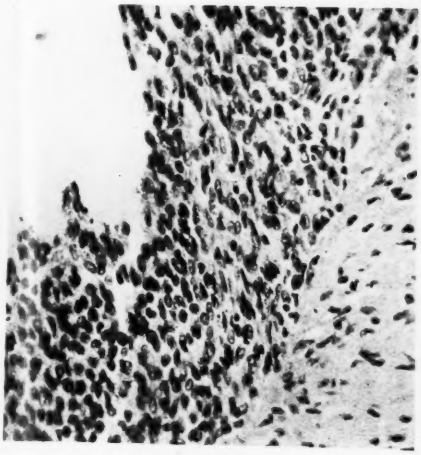

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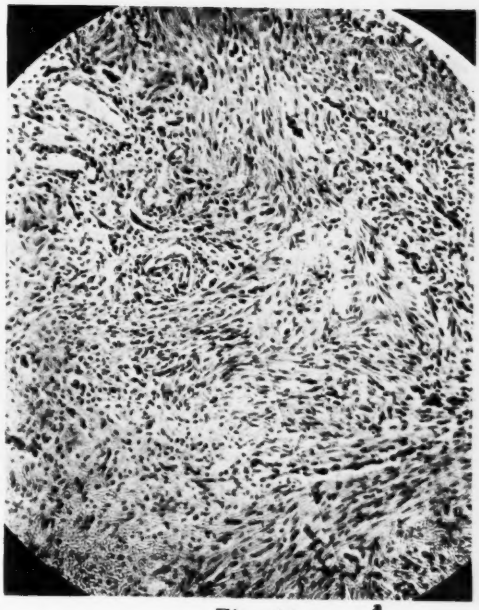

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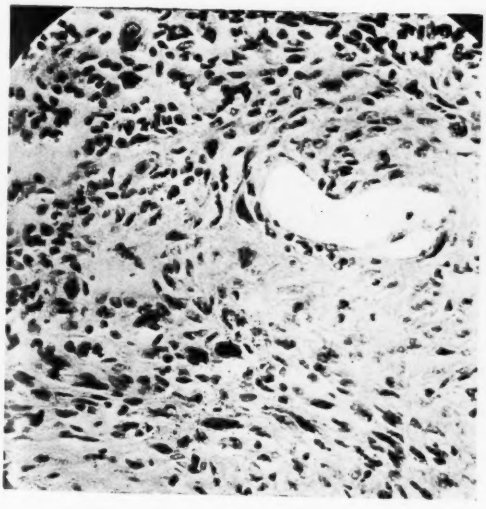

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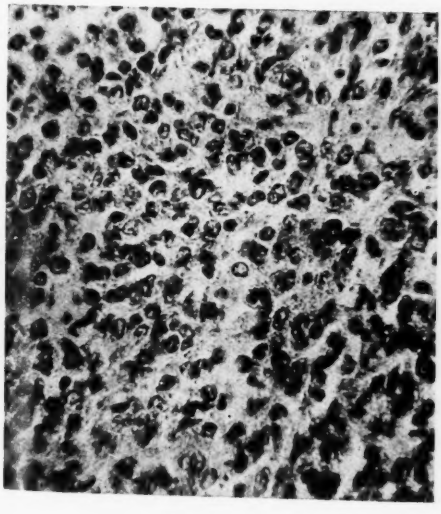

Fig. 71.

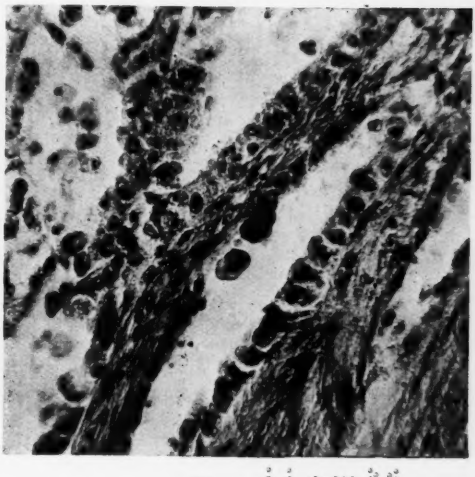

Fig. 72.

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Fig 73.

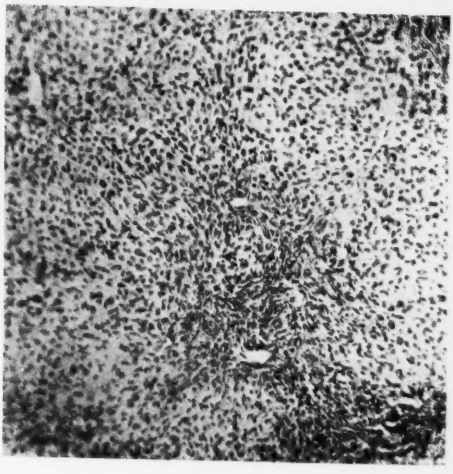

Fig. 74.

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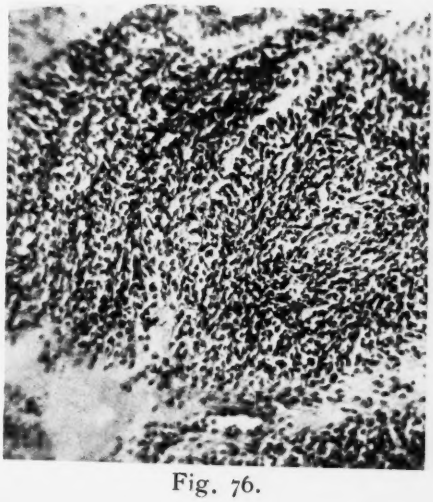

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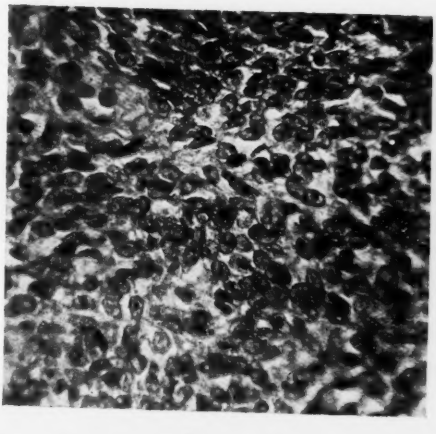

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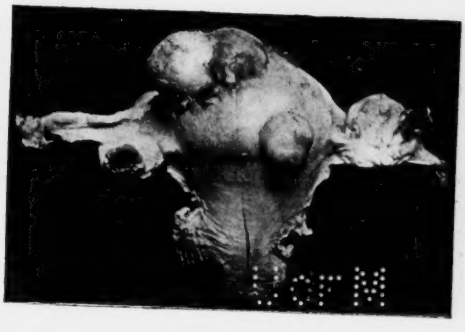

Fig. 78.

Wau

What is the cause of this sarcomatous reversion? Certain factors seem to favor its occurrence. The menopause is one of these, for the sarcomatous degeneration occurs most frequently about that period, though it may occur both earlier and later. Again, it is more common in multiple fibroids (though it does not often affect more than one of them), than in the solitary tumour. It is equally common in all varieties of fibroid. Earlier writers claim a predominance for the submucous variety, but operative interference was not then resorted to so early as now, and hence many of the really intramural may have been reckoned as submucous tumours. It has been suggested that the œdema or hyaline degeneration, so frequently present in the parts of the fibroid surrounding the sarcomatous foci, may precede and help to bring about the embryonic reversion. It is difficult to see how the hyaline degeneration, being a necrotic process, can have any such influence, and though the œdema may bring about a relief from mutual cell pressure, and a freer supply of nutrient fluid, it can hardly, as already explained, be regarded as able to originate vegetative activity of this kind (vide Figs. 66 and 67 and their descriptions). There is one particularly interesting point in these sarcomatous foci which deserves mention in discussing their causation, and that is the frequency with which a number of them are met with in the same fibroid tumour, and apparently as entirely separate growths, and not outlying parts of the one growth. Are all of them primary and independent centres of growth? But primary sarcomatous growths in other situations are single, and not multiple, the latter being a characteristic of secondary growths. It seems probable then, though practically incapable of proof, that only one of them is primary and that the rest are metastases. Some disturbance of the natural course of growth is all that is necessary to explain the production of this primary focus; something which upsets the (probable unstable) physiological balance of cell activities, directing the whole cell energy, into vegetative growth and multiplication.

II.—Sarcomata.

Tumours with the characters of sarcomata throughout, also occur in the body of the uterus. They are sarcomata from the beginning, comparable to the sarcomata occurring in other situations, though they may present many of the macroscopic appearances of a fibroid, particularly of the intramural variety. They are much rarer than sarcomatous foci within fibroids. They occur either as submucous or as intramural growths. The former originate in the endometrial stroma, and form either a diffuse or polypoid submucous tumour. They may give rise to sudden and profuse hæmorrhage, and are liable to be mistaken either for a simple polypus in younger,

or for a cancer in older patients. The histological examination of curettings will assist the diagnosis in most cases, but it is to be remembered that, even when the whole growth is available for such examination, it is difficult in some cases to say whether the growth represents a benign fibroid or a sarcoma.

Figs. 68 to 72 are taken from a case which could only be diagnosed as a sarcoma from curettings, but which, on fuller investigation, shows an undoubted cancerous growth. The clinical history of the case has not been preserved, but the uterine cavity is completely filled with a large submucous tumour (vide Fig. 68), which on section presents a dull grey fleshy appearance relieved by numerous darker areas of degeneration and hæmorrhage (vide Fig. 69). The remains of the uterine cavity are seen below, and there is a small discrete fibroid in the wall of the uterus to the left. The large size of the tumour is in favour of a fibroid or a sarcoma and not a cancer, which very rarely reaches such dimensions. On microscopic examination all the inner part of the growth presents the characters of a sarcoma, while the outer part which includes the uterine wall shows the structure typical of a columnar-celled epithelioma (vide Figs. 70, 71, and 72). The tumour is thus, apparently, composed of a coexistent sarcoma and cancer, both of which originated in the endometrial tissue.

One variety of sarcoma, the so-called *sarcoma botryoides* forms cyst-like masses, presenting a resemblance to a hydatid mole. It consists of round, spindle and irregular cells in a matrix of clear spaces traversed by a network of fine fibrils and delicate blood-vessels. The intramural variety of sarcoma occurs also as a diffuse and as a localised tumour. Both are indistinguishable clinically from the fibroid, though the rapid increase in size of the uterus may arouse suspicion. They may break through the walls of the uterus, invade the surrounding structures, and cause metastases. The localised form is often strikingly like a fibroid, and the microscope has to be used before its sarcomatous character is revealed. This discloses a picture not unlike that which is found in the sarcomatously degenerated foci already referred to, suggesting an origin either in young fibroblasts or in young myoblasts of the uterine wall.

Fig. 73 gives the appearances on section of a localised intramural tumour, apparently of this class. It is not at all unlike a degenerating fibroid, but on microscopic examination it presented the histological characters, in all parts examined, of a sarcomatous growth originating in the walls of the blood-vessels (vide Fig. 74). The clinical history of this case was not preserved. In another case the growth, though still localised, was more diffuse. It was an imperfectly circumscribed interstitial tumour in the anterior wall of the uterus, which had become submucous, bulging into the uterine

cavity. It measured 4½ inches in diameter. On section it had an indefinitely fasciculated appearance not unlike an ordinary fibroid which had undergone considerable degeneration throughout and much cystic change, particularly in its upper parts (vide Fig. 75). Under the microscope it presented, both in its upper cystic parts (vide Fig. 76) and in its lower solid portions (vide Fig. 77), many of the characters of sarcoma. The cells, which constituted the chief part of the growth, were spindle and irregular shaped, the interstitial substance mostly scanty, and many of the blood-vessels rudimentary. At the same time there were many thick-walled blood-vessels and some well formed fibroid strands, and it might be regarded as a border line tumour, or a fibroid in which a change suggestive of sarcoma had arisen. The patient was a young woman, æt. 27, under the care of Mr. J. Furneaux Jordan, who himself regarded the case as one of primary sarcoma of the uterus. She had been married for two years and had no children. She suffered from some menorrhagia with dysmenorrhœa for 8 months, but had not lost flesh. The tumour reached to the umbilicus and was movable. The operation was successful and the patient was in good health when last heard of, about a year afterwards. The appearances and structure of the diffuse form of intramural sarcoma are similar, though in the writer's experience primary sarcoma of the uterus in all its forms is rare. There is considerable risk of classing a sarcomatously degenerated fibroid as primarily a sarcoma of the uterus, unless the whole of the growth has been carefully investigated.

III. The Co-existence of Fibroids and Cancer of the Body of the Uterus.

Fibroids and cancer of the body of the uterus are so often found within the same uterus, that it is difficult to resist the conclusion that the former favours the development of the latter. On the other hand, fibroids rarely co-exist with cancer of the cervix. Apart from fibroids, cancer of the cervix uteri is about twelve to fifteen times more frequent than cancer of the corpus uteri, but when fibroids and cancer are co-existent in the same uterus, cancer of the body appears to be as frequent as cancer of the cervix. Therefore, when the presence of a fibroid has been definitely ascertained, the possibility of the concurrence or future onset of cancer has to be borne in mind. It may disclose itself by the appearance of, or a considerable increase of, bleeding or by a profuse discharge, especially at the climacteric (vide Figs. 78 and 79).

IV. Cancer.

Cancer of the body of the uterus is a malignant epithelial tumour of the uterine mucosa. It has its origin in the epithelium, either of the surface or of the endometrial glands, and consequently

encroaches early upon the uterine cavity. Symptoms, of which the most characteristic is an abundant hæmorrhagic discharge, appear much earlier than in the case of submucous fibroids, and even earlier than in endometrial sarcomata.

Macroscopic appearances. A more or less circumscribed tumour of varying size, projecting into the uterine cavity, is the form which this growth takes most frequently (vide Figs. 80, 81, and 82). Its surface is mostly rough, eroded, and sometimes cystic, villous or papillomatous, its consistence soft and friable, and its colour white or grey, and often red in places from recent or old hæmorrhagic foci. The projecting part of the growth may become polypoid or break down and escape under the influence of necrotic and disintegrating processes of either a bland or infective nature, leaving an ulcerated surface, which has at first sight little or none of the appearances of a tumour (vide Fig. 82). Similar malignant ulcers are met with in the stomach, intestines, etc., and their true character is discerned by the extent to which the growth involves the uterine wall as well as by their microscopic structure. Invasion of the deeper parts of the endometrium and to a certain extent also of the muscular coat, has occurred in all the tumours by the time they come under observation. Extension in this direction is slow, much more so than towards the uterine cavity, and it may take a long time before it completely penetrates the muscular coat and reaches its peritoneal covering. Rapidly growing cases may accomplish this in about a year, but most cases take longer, two to five years, or even more. As is but natural, growth inwards and outwards is attended by growth in other directions as well, and a tumour, at first circumscribed and local, may come to implicate the whole uterine cavity and the greater part of that wall of the uterus in which it is growing. A *circumscribed* (vide Figs. 80, 81, and 82) and *diffuse* (vide Figs. 83 and 84) form of cancer are thus recognised; the latter being mostly an extension of the former and occurring particularly in tumours of quick growth. Parts, even to almost the whole of a tumour, may undergo a coagulation necrosis without breaking down and become converted into a cheesy-looking substance suggestive of caseation (vide Fig. 85). One or two cases in which this caseous-looking change has occurred extensively have been put on record. The uterus remains freely movable for a long time. It sometimes becomes fixed by simple inflammatory adhesions in advance of the extension of the growth, but this fixation becomes at once greater and more serious when the growth has penetrated the peritoneal coat and invaded neighbouring structures. This invasion and fixation are of late occurrence, rarely, if ever, occurring until after well marked symptoms have been present for some time, sufficiently marked at any rate to arouse suspicion. Hysterectomy can be successfully undertaken up to this time, and the importance

of an accurate knowledge on the part of practitioners of medicine of the symptoms of this disease can hardly be over estimated. Moreover neither lymphatic nor vascular metastases arise readily. They may not occur till some time after fixation of the uterus has taken place, and it is therefore possible to eradicate the growth completely. Unfortunately, it is not possible here, as it is in some other situations, to say whether lymphatic metastases has already arisen, when the operation is made; for the lymphatic glands affected lie beyond the reach of exploration, as has been explained in describing the relationship of the uterine lymphatics.

Microscopic appearances. The microscopic appearances of the growth are similar to those of an ordinary columnar epithelioma, presenting tubes and spaces lined by epithelium in a fibro-cellular stroma (vide Fig. 86). The cells are mostly of the columnar type when only one layer thick, but tend to become polymorphous when there are several layers. They are not separated from the stroma by any basement membrane. They are larger and their nuclei stain more deeply than the cells of the normal mucosa and utricular glands. Moreover they are placed more irregularly within the cells, occupying different levels within adjacent cells. The cancerous tubes thus assume, even when they resemble the utricular glands in shape, a more distinct and prominent appearance (vide Figs. 70, 72, 86, and 87). But they rarely resemble them even in shape. The glands form regular tubes which run at right angles to the surface epithelium, into the endometrium as far as, or even a short distance within, the muscular coat of the uterus, where they end in blind extremities, sometimes branching into two just before doing so. They do not give off branches in their course, except under the influence of endometrial inflammations, when a certain amount of branching may occur. The malignant tubes on the other hand run in every direction within the growth, branch freely and assume all kinds of shapes, so that it is impossible to trace any single tube for any distance in any section, as can be so often done in the normal or even in the inflamed mucosa (vide Fig. 88). They invade the muscular wall freely and can be traced outwards for varying distances towards the peritoneal covering of the uterus, occupying the distended lymphatic spaces between the muscular bundles. The outline of individual tubes and spaces may become irregular and complicated by ingrowing papillary processes. The epithelium lining the spaces may multiply and fill the lumen with a solid mass of cells. When this is a feature of many of the spaces in any microscopic field, the term *adeno-carcinoma* is often applied to the growth (vide Fig. 90). This filling of the spaces with cells is sometimes followed by a degeneration of the lining layer of cells, so that these spaces now present the appearance of an ordinary alveolar carcinoma, in which a mass of cells, united only by their cement

substance, lies free within the alveoli, a stage which is sometimes referred to as a *spheroidal celled* carcinoma (vide Fig. 90); a refinement of nomenclature which is equally applicable to many columnar celled epitheliomata in other situations, and is of doubtful utility. The same thing may be said of the differentiation of this cancer into two types; an *everting* type, in which the tubes preserving somewhat their tubular shape, grow and branch outwards into the stroma (vide Fig. 88), and an *inverting* type, in which the tubes become dilated into irregular shaped spaces, giving off papillomatous ingrowths into their interior (vide Fig. 88). Mitoses within the epithelial cells are not uncommon in several parts of the tumour. The stroma of the tumour consists of rounded and slightly irregular shaped cells resembling those of the endometrium, with little or no fibrillation and numerous blood-vessels. In the inner parts of the tumour it is the product of the stroma of the endometrium, consisting partly of the pre-existing and partly of newly-formed endometrial tissue. In the deeper parts of the tumour which invade the muscle, it is the product of the intermuscular fibrous tissue, and is more fibrous than elsewhere. The muscular bundles undergo atrophy from pressure and erosion, but show no signs of reactive reproduction. There may be considerable œdematous, myxomatous, or hyaline change within the uterine wall, in the neighbourhood of the cancerous growth, and sometimes cancerous emboli may be detected within dilated lymphatic spaces within the muscular wall at some distance beyond the margin of the tumour (vide Fig. 89). But the most striking feature of the stroma in great parts of the tumour, particularly towards the uterine cavity, is its scantiness. It is frequently reduced to the smallest limits, consisting of no more than the thickness of a single cell separating the cancerous spaces from one another (vide Fig. 91). The blood vessels lie within the stroma, and many of them have very thin walls, so that hæmorrhages are common. Clusters of leucocytes are often seen around the blood-vessels, and invading the tubes. They are due to secondary inflammatory processes (vide Fig. 91).

Retrogressive Changes.—Degenerations and necroses are common within the central parts of the tumours, and may arise elsewhere. They are due to loss of blood supply and are comparable to similar changes within cancers in other situations. A mucoid or mucinoid change may convert portions of the cancer into a structureless jelly-like substance. Droplets of a mucinoid substance appear within the protoplasm of the epithelial cells, which coalesce and cause the disappearance both of the protoplasm and of the nucleus. The intervening stroma suffers the same change a little more slowly. But perhaps the most interesting change is that which occurs within the centre of some of the cell masses filling the spaces in certain of the cancers. The most central and hence the oldest of these cells

become glassy looking and compacted together, so that the whole cell mass comes to resemble the cell nests of a squamous epithelioma more or less closely (vide Figs. 92 and 93). Several cases of so-called squamous epitheliomata of the body of the uterus are on record, which are reported to resemble the histological appearances characteristic of a squamous cancer of the cervix uteri, and the production of the cell nests is explained in the usual way as the result of a similar hyaline or keratinous process. The horny change which characterises the stratum squamosum of the normal skin, and to a less extent the central cells of a cell cluster of a squamous epithelioma, is the natural result partly of a physiological adaptation and partly of a lack of nourishment and a loss of moisture. The term hyaline is applicable to it only in so far as it assumes a more or less glassy appearance. The cast-off columnar cells of a cancer of the uterine body have no natural tendency to a keratinous change, and the assumption of the cell nest appearance is probably due to some mucinoid degenerative change, followed by a loss of moisture.

Curettings. An accurate knowledge of the minute histological appearances found in these cancers is essential for a correct interpretation of curettings. While exceptional difficulties sometimes present themselves, it most frequently occurs that a decision has to be made between cancer and a benign endometritis. In the latter, the tubes resemble the normal utricular glands, and there is a plentiful intervening stroma; in the former, the tubes are aberrant and the stroma is scanty (vide Fig. 94). These leading distinctions are often sufficient to enable a diagnosis to be made with certainty, but all the cancerous characteristics should be kept in mind and applied to the solution of more difficult cases. It must not, of course, be forgotten that the histologist can only express an opinion upon the nature of the curettings submitted to him. The clinician who knows all the history of the case, and has explored the uterine cavity, can best apply the histologist's findings to the individual case. But too much stress cannot be laid upon the importance of an early recognition of the disease. A great improvement in the outlook has occurred within recent years as the result of a combination of a better knowledge and a greater alertness on the part of the general practitioner, and of a readier resort to uterine exploration, histological examination and operation on the part of the specialist. It is computed at present that about one-third of the cases are curable by operation, and it is at least possible that the proportion may be increased in the future.

Cause and Origin. It is a disease of old age, the average age being nearer 60 than 50. There is usually a definite interval of years, sometimes only of months, between the menopause and the first appearance of symptoms. It may, but rarely does, come before the climacteric. Many of the patients are unmarried, and

among married women it is commoner in those who have had few, than in those who have had many children. It starts in the epithelium, either of the utricular glands or of the surface, more often the former, it is thought. Its origin in the surface epithelium has been traced by some to a preliminary proliferation, whereby this epithelium comes to consist of several layers thick, a condition known as *leucoplakia* or *ichthyosis*. After a time definite ingrowths from these layers invade the endometrium in the form of tubes, and constitute a definite cancerous condition. It is cancers of this nature which may show the so-called cell nest formation. It is a curious method of growth, for it must be the result of a special vegetative activity at one point of the surface epithelium and not at many; multiple points of origin of primary cancer being contrary to experience. But whether the cancer starts in the surface epithelium or at some point in the utricular glands, all the evidence goes to show that the new cancer cells and tubes are entirely the offspring of those first formed, though delusive appearances may sometimes suggest a direct conversion of the normal epithelium into cancerous cells at the advancing margin of the growth. The influence which starts the excessive vegetative activity is here, as in cancers elsewhere, unknown. It is interesting, however, to note that the body of the uterus is far less liable than the cervix to both irritation and to cancer.

Comparison between Cancer of Body and Cervix. A short comparison of the chief differences between cancer of the body of the uterus and that of the cervix is interesting.

1. Frequency. Cancer of the body is twelve to fifteen times rarer than that of the cervix.

2. Age Incidence. Cancer of the body is commonest between 50 and 60; of the cervix between 35 and 45.

3. Influence of Childbearing. Cancer of the body is not related to childbearing, while cancer of the cervix appears to be. At any rate cancer of the body occurs oftenest in the unmarried, or in women who have borne few children; while cancer of the cervix occurs in women who have borne large families, or at least the average number of children.

4. Malignancy. Cancer of the body is much less malignant, both locally and generally than cancer of the cervix, and is less prone to recur after removal.

5. Fibroids. The co-existence of fibroids and cancer of the body is common; of fibroids and cancer of the cervix is rare.

6. Pyometra. Cancer of the body is less commonly followed by pyometra than is cancer of the cervix.

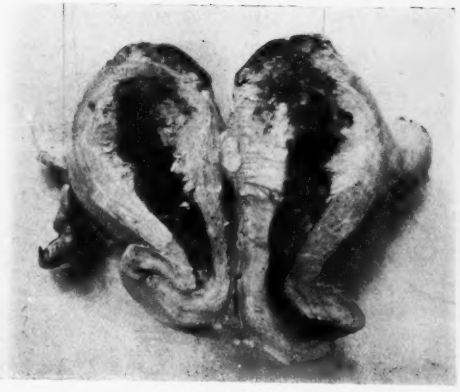

Fig. 79.

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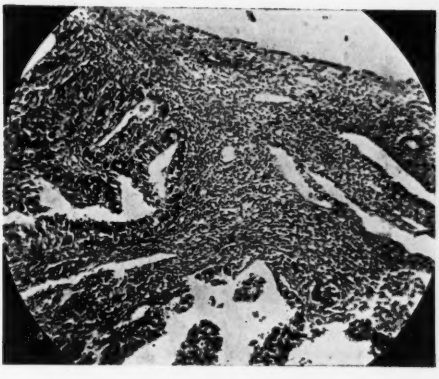

Fig. 86.

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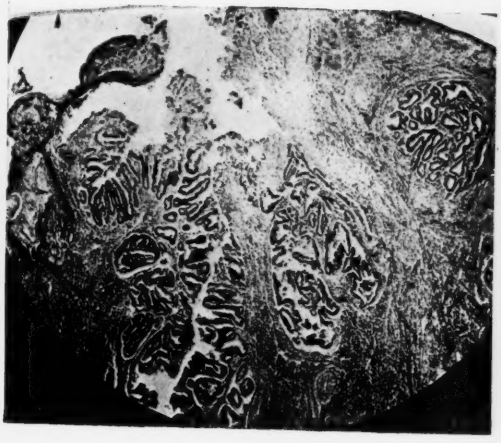
Fig. 87.



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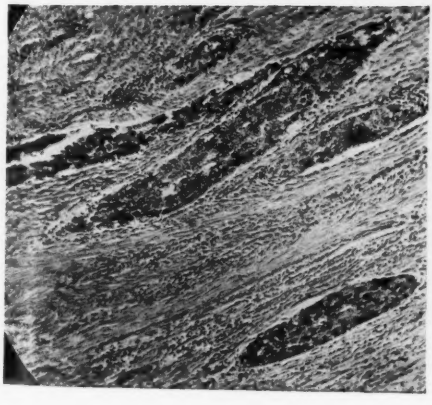

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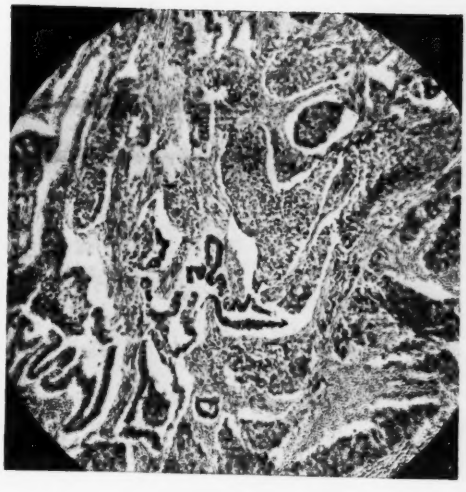

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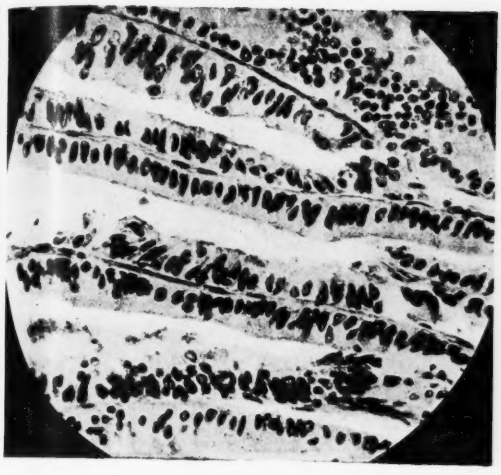

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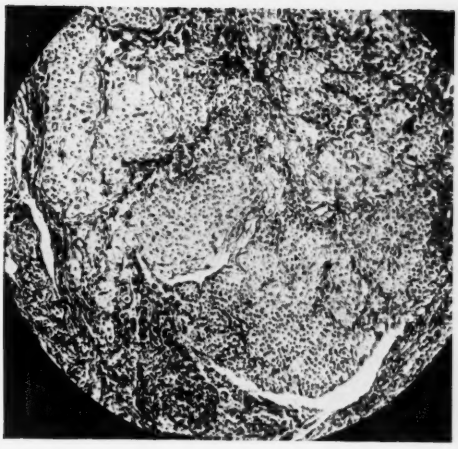

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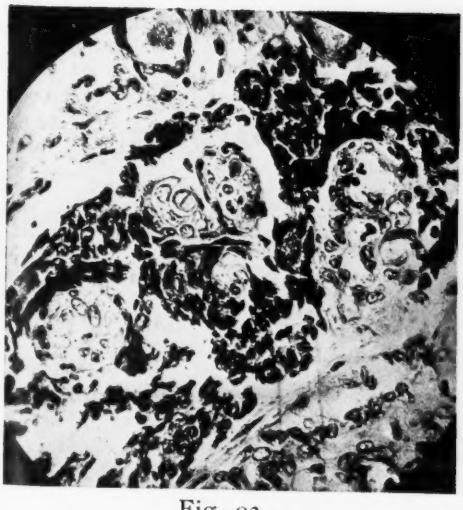

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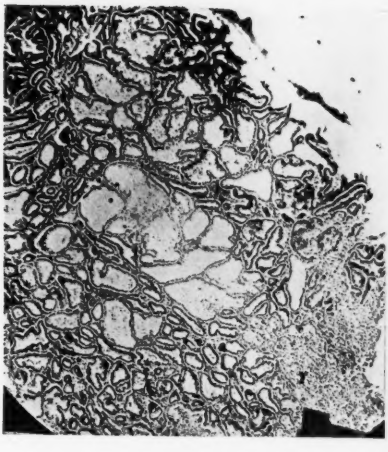

Fig. 94.

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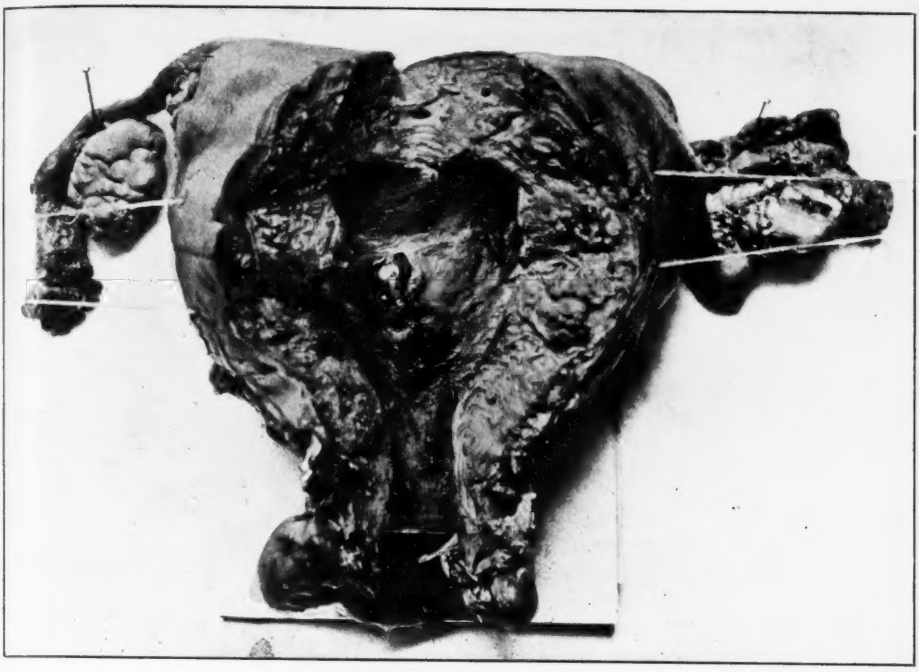

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Fig. 96.

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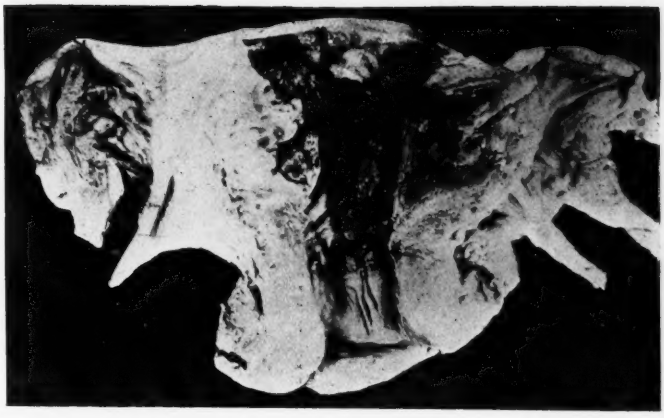

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Fig. 99.

Fig. 100.

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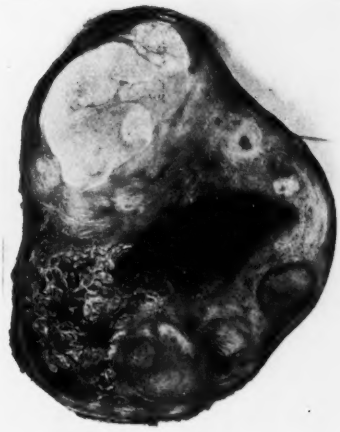
Fig. 101.



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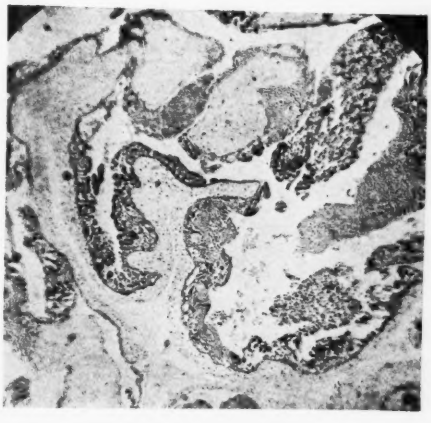

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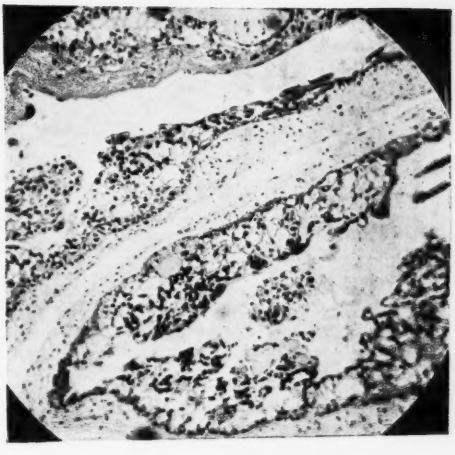

Fig. 104.

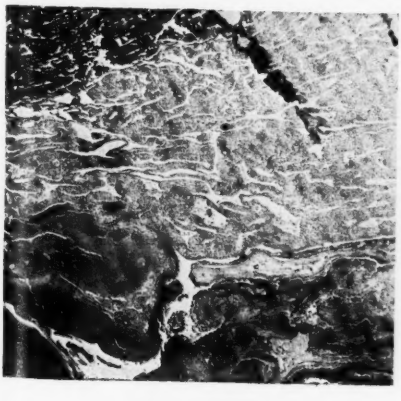

Fig. 105.

Fig. 106.

V. Chorio-epithelioma Malignum and Placental Mole.

The former name is now generally adopted for the malignant epithelial tumour, which springs from the ectoderm cells of the villi of the chorion. It was formerly known as a deciduoma or syncytioma malignum or malignant serotinal tumour. It is a growth, which stands in a class by itself, inasmuch as it springs from fœtal cells, invading and destroying the tissues of the mother, instead of undergoing involution, atrophy and disappearance at the end of its normal physiological cycle.

Macroscopic Appearances. It forms a mottled or dark red, maroon coloured, soft, friable spongy mass of varying size, mostly localised and definite in outline, but occasionally diffuse. It projects into the uterine cavity, often only to a slight extent, forming a rough nodular surface (vide Figs. 95, 97, and 98), but sometimes filling it more or less completely, its free surface being generally rough and much broken, rarely smooth. It is fixed to the uterine wall, which it always invades, by a broad base (vide Figs. 96 and 99). Some part of the growth is almost always within reach of the finger when digital exploration of the uterus is undertaken (vide Figs. 98 and 99). The extent of this erosion varies, but it always involves the muscular coat to some extent at least. The penetration of the muscular coat may be slight as in Figs. 96 and 99, so that the growth may be localised and superficial, or it may be great, sometimes eating through the uterine wall and invading any of the pelvic viscera, intestines or other neighbouring structures. The neighbouring mucous membrane of the uterus is either healthy-looking, inflamed, or shows some decidual membrane. The growth directly or indirectly extends to the vagina in about half of the recorded cases, this being the site in which secondary metastatic growths most commonly appear. On section the most striking additional feature is the prevalence of hæmorrhages of all ages, old and recent blood clots forming, in some cases, more than three-fourths of the whole tumour.

Successive sections, passing through the base of the tumour, show that the deeper parts of the growth send out branching processes of varying size into the neighbouring part of the myometrium which in different sections of the latter appear as separate growths (vide 96, 99, and 100). Many of them are merely outlying extensions of the primary tumour, though some of them are distinct centres of secondary growth. The *placental mole,* in cases of blighted ovum where the placenta and membranes (being the sole product of conception) form an irregular fleshy mass (the *fleshy mole*) sometimes imbedded in blood clot, (the *hæmorrhagic mole*) may present certain resemblances to the chorio-epithelioma; but in its more usual form (in relation to premature birth) that of

the vesicular or hydatidiform mole, it constitutes a much larger growth, always distending the uterus to a greater extent than a normal pregnancy of a like date or than a full term fœtus. The vesicular grape-like masses of this growth differ entirely in appearance from a chorio-epithelioma, though they may likewise be infiltrated with blood clot. Figs. 101 and 102 show the appearances (opportunities of seeing such specimens being infrequent) of such a mole with hæmorrhage *in situ*.

Microscopic Appearances. An appropriate piece must be selected, preferably from the white marginal part of the growth which has not been invaded by either the prevalent necrosis or by hæmorrhages. The structure is essentially cellular, the cells being of the epithelial type. It is true that in the majority of cases there is a certain amount of a fibro-cellular connective tissue which in places may run out into finger-like processes, on the outside of which the cells lie, presenting a picture similar to that of a normal chorionic villus (vide Fig. 104). But this fibrous basis or core, though present in most instances of this tumour, may be altogether wanting in other cases (vide Fig. 111). It is in one sense a fortuitous constituent, the last to come and the first to go. It is nature's device for the rapid conveyance of nutriment from the mother to the fœtus inasmuch as it supports the allantoic vessels which it carries. Its presence in the chorio-epithelioma depends upon the particular stage in the cycle of gestation at which the tumour began to grow. This fact will become clearer, when the evolution of the growth is traced a little later on; meanwhile let us return to the cells, which comprise the real and essential tumour. It has no stroma and no blood-vessels, nothing but cells. These cells are of two kinds, plasmodium or giant cell masses, the *syncytial cells*, and smaller polyhedral cells, the *Langhans' layer cells*. The syncytial elements are large, elongated or irregular masses of finely granular protoplasm, containing many nuclei rich in chromatin and often also vacuoles. The outlines of the masses are generally well defined and distinct, but they show no lines suggestive of cell division (vide Fig. 112). They recall the giant cell masses met with in sarcomata of the suprarenal and some other parts. The Langhans' layer cells are of moderate size, mostly polyhedral in shape, but may be spherical, irregular or spindle-shaped; their protoplasm stains less darkly than that of the syncytial elements, and contains globules of glycogen, their nuclei (usually only one in each cell) have a moderate amount of chromatin and often show mitoses (vide Fig. 113). The proportion in which these two kinds of cells exist, is capable of great variation in different tumours and in different parts of the same tumours. Sometimes the one and sometimes the other greatly predominates, and whilst they may appear often to be mixed up together, the prevailing relationship is syncytial cells outside and polyhedral cells inside (vide Figs. 104

and 107), in more or less parallel rows, or forming irregular alveoli filled with blood, or the latter are grouped around the former in masses. They invade the uterine mucosa extensively, filling and often distending its vascular spaces. They extend into the muscular wall, eroding and lying between the muscular bundles (vide Figs. 107 and 109), often continuing for long distances outwards. They are most frequently seen around the veins and other vessels of the muscular coat, often running for some distance within the outer coat or dissecting a way between the inner and middle coats, and always reaching, sooner or later, the vascular lumen, which they proceed to fill. They penetrate the uterine wall much in the same way as the roots of a tree grow into the ground. The syncytial cells are more actively erosive and phagocytic, and are often found alone or much in advance of the polyhedral cells. It can be determined by means of serial sections that many of these far outlying cell masses are really far reaching rootlets, though in other cases they are emboli, which have become detached from the growth and lodged within some vein further out, either within the wall of the uterus (vide Fig. 114) or broad ligament (vide Fig. 115), or elsewhere.

Mode of Evolution. It is difficult to obtain a clear conception of the mode of growth of this tumour without tracing the main steps in the development of the villi of the chorion. In the earliest embryo known to us (Bryce's), which is about 14 days old, both the syncytial elements (outside) and Langhans' cells (inside), products of the ectoderm of the trophoblast, are well developed. The differentiation between them occurs therefore at a very early date and there is no proof, in the subsequent stages of either normal or abnormal pregnancies, that the cell elements of the two layers are interchangeable. In other words all subsequent growth of syncytium or of Langhans' cells springs by direct lineal descent from the respective cells of their own class, viz., syncytium from syncytium and Langhans' cells from Langhans' cells existent at this early period. Both have extremely active vegetative properties, whilst the syncytial elements possess also strongly erosive and phagocytic qualities, which enable them to penetrate the decidua, and reach the venous sinuses. The Langhans' layer cells are probably nutritive, but they may also, under certain circumstances exert erosive or destructive properties. With the development of the allantois a vascular fibrous tissue core appears within the primitive and previously cellular representative of the villus, in order to transfer nourishment more effectually from the mother to the fœtus. The young villi continue to penetrate into the venous sinuses of the decidua serotina during the period of formation of the placenta, the syncytial cells being generally prevented from invading the uterine muscle by the deepest layers of decidual cells (vide Figs. 105 and 106). With the approach of the end of the

period of normal gestation, the villi begin to atrophy, the fibrous core first disappearing, followed by the syncytial elements, and, lastly, by the Langhans' cells. The attachments of the villi are thus loosened, so that they readily slip out of the venous sinuses at the birth of the fœtus. But under certain pathological conditions, imperfectly known at present, the epithelial elements of the villi may retain their inherent vegetative properties, continue to grow, and form actual tumours. Interferences with the normal period of gestation, such as early abortion or a blighted ovum, in which no fœtus is formed or at any rate found, apparently favour this growth. It thus seems to be probable that the fœtus, by its metabolism, exerts an inhibitory, regulative or restraining influence upon the vegetative activity of the cells of the villi and that the premature withdrawal of this influence results in overgrowth. It is also possible that the character of the overgrowth may be influenced by the date or stage of the gestation cycle, at which this withdrawal occurs. An attempt has been made to explain in this way the differences in histological structure which individual cases of chorio-epithelioma may present. Thus in some of them the villi are represented by cellular outgrowths similar to the primitive kind, and never come to possess any mesoblastic core. It is thought that the abnormal influences, which result in a loss of normal restraint, arise at a later date in these cases than in the more common examples, in which the villi show some trace of the mesoblastic core, inasmuch as this core is the first part of the villus to disappear (vide Fig. 110). In the same way the sarcomatous looking chorio-epitheliomata, of which a few have been described, may start at a still later date, after the syncytial elements have also had time to disappear. The chorio-epithelioma then is a tumour of high local and considerable general malignancy. It is the result of the retention of their vegetative properties by the fœtal ectodermal cells, after the termination of the normal period of gestation. But there is another and commoner result in the formation of the placental mole, a growth of low local and very slight general malignancy.

Relations to Placental Mole. The latter tumour is of great interest. It consists of an altered embryonic sac, with no sign of an associated fœtus in most cases. Two types occur—the *fleshy* and the *hydatidiform*. The former is the rarer. It starts earlier, arising chiefly in cases of blighted ovum, the fœtus being absent or dying and becoming absorbed, whilst the placenta continues to grow, and fills the uterus with a large fleshy mass prone to hæmorrhage and putrefaction. The *hydatidiform mole*, on the other hand, arises mainly in cases of premature birth, in which after expulsion of the fœtus, portions of the placenta remain behind, whose chorionic villi continue to grow, and at the same time become swollen by a mucoid

change, which converts them into masses of grape-like clusters, having a superficial resemblance to hydatid cysts, hence the name. Whilst in most cases the fœtus is no longer present, in a few a dead one has been found, and in still a few others, in which the hydatid change has affected only a portion of the placenta, a living child has been born. The hydatidiform, like the fleshy mole, is liable to hæmorrhages, which, added to its increase in size by growth, stimulate the uterus sooner or later to extrude it. Opportunities of ascertaining exactly how far into the uterine wall the villi penetrates in these cases have so far been few in number, and the prevailing opinion that their growth, though continuous, is restricted to the limits of the normal placenta, is rather of the nature of an inference, founded upon an absence of subsequent growth after evacuation in the majority of cases, than of actual knowledge. In a proportion of the cases, put by some as high as 30 per cent., a deeper local erosion occurs, so that neither spontaneous extrusion nor artificial evacuation followed by curetting, can free the uterus from all the invading fœtal cells. Both local recurrence and metastases remain possible, and have occurred in a few cases. The depth of uterine wall erosion varies somewhat in these cases, but it may involve the muscular coat to some extent in a certain proportion of them.

This raises an important point which may serve to explain the frequent sequence of the chorio-epithelioma to a previous placental mole, abortion or otherwise disturbed pregnancy. As shown by the Figs. 117 and 118, Mr. Hewetson demonstrated to the writer in a part of this particular case of hydatidiform mole after the removal of the uterus, that neither natural nor artificial evacuation by means of finger or curette (as complete as any that could be used upon the uterus *in situ* in a living case) could suffice to free the uterus entirely from the invading fœtal villi. It is therefore a reasonable assumption that if the uterus had been merely emptied out in this case and not removed, a chorio-epithelioma would subsequently have developed. It is hoped that the extent of penetration of the muscular wall by the fœtal elements will be determined as far as possible in any similar cases of placental mole which become available. Two possibilities present themselves, first a varying degree of inherent vegetative activity on the part of the invading fœtal elements, and second a varying depth of penetration by them of decidua and uterine wall. The latter is probably the chief factor, though the former may play a part. In the great majority (over two-thirds) of cases of placental mole the penetration of the maternal tissues by the fœtal elements may be so slight as to permit of complete evacuation, whereas, in the minority, fragments remain behind, whose inherent vegetative activity overcomes the resistance of the maternal tissues and by active growth constitute the tumour known

as a chorio-epithelioma. Indeed this theory would account in a satisfactory way for the differences in histological structure presented by chorio-epitheliomata. In most cases, as in Figs. 117 and 118, portions of a complete villus with fibrous core and epithelial covering would remain within the uterine wall and the resulting chorio-epithelioma would therefore show villi of a similar structure; but occasionally only syncytial elements or Langhans' cells or both would remain and result in a chorio-epithelioma with a corresponding histological structure.

Metastases. Considering the freedom with which these growths and outlying cells from them penetrate into the blood stream (vide Figs. 119, 120, 121, and 122), it is surprising that metastases are not more frequent. But it is to be remembered that the connection between the growing fœtal cells and the blood-vessels of the mother is hardly less free, even in normal pregnancy. It has been shown in eclampsia, where the violent muscular contractions may favour separation of some of the cells and their passage into the circulation, that syncytial elements may be present in the capillaries of the lungs and other organs, and it is at least possible that their escape into the blood stream may sometimes take place in ordinary pregnancy, particularly towards its termination. But it is to be remembered that these fœtal elements have in all probability lost much of their inherent power of reproduction and thus may fall an easy prey to the phagocytic action of the vascular endothelium and other cells. The frequency with which clinical signs of pulmonary apoplexy occur compared with metastases in the lungs in chorio-epithelioma is cited as a proof that many of these emboli die after impaction without starting a metastatic growth. There may be something in this contention, though it must not be forgotten that thrombosis, within the placental and other vessels invaded by the growth, is of frequent occurrence, and that the resulting emboli may consist of blood clot only, and be devoid of any of the fœtal cell elements. That some of the malignant emboli may be fairly large, and contain not only epidermic elements, but mesodermic as well, is shown by some of the metastases, *e.g.*, in the lung, exhibiting a more or less typical villous structure, with central fibrous core, surrounded by both Langhans' cells and syncytial elements (vide Fig. 116). It is easy to understand that this kind of separation should occur more readily in the loosely built and rapidly growing villous outgrowths of the chorio-epithelioma than in the more compact villi of normal pregnancies; but Schmorl maintains that portions of chorionic villi may be detached and become emboli, which, after impaction, form a primary chorio-epithelioma in some extra-uterine situation. Whether this be true or not, it is certainly not the explanation of the origin of the instances of this primary growth which have been met with

in the testicle, mediastinum, and cranium. These are true teratomata and independent entirely of any uterine pregnancy. Secondary chorio-epitheliomata in cases of the primary uterine form are met with often in the vagina, not uncommonly in the lungs (vide Fig. 116), and sometimes in the liver, spleen, and ovary. It also occurs as a primary growth in the ovary.

Cause. It follows from the mode of evolution of both the placental mole and the chorio-epithelioma, that, in a sense, the same cause operates in both cases, viz., the preservation of inherent vegetative characters by the fœtal ectoderm cells of the trophoblast and the continuance of their physiological manner of growth within the maternal tissues, when freed from the control and restraint of certain governing physiological laws. These laws operate in normal pregnancies either through the living fœtus or in some other way, so as to weaken and destroy the inherent vegetative endowment of these fœtal ectoderm cells and secure their extrusion from the uterus, when the end of the period of normal gestation has been reached. On the other hand in abnormal pregnancies, these laws are either inoperative or inefficient during part or the whole of the period of maturation of the ovum and the resulting (usually premature) extrusion of the fœtal elements from the mother may be imperfectly accomplished. Some of the ectoderm cells of the trophoblast, still retaining their natural endowment of vegetative activity, remain behind within the uterus and by continuance of growth produce a chorio-epithelioma. This retention is more likely to occur in the graver cases of disturbance of maturation of the ovum, *i.e.*, of abnormal pregnancies such as placental mole, abortion and the like, and the records of published cases of chorio-epithelioma show that in fully one half of them there has been a preceding placental mole and that in the remainder there is a more or less complete history of some other form of previous abnormal pregnancy. In the very few cases which are said to have followed normal pregnancies, it is reasonable to suggest that the histories are incomplete, all the more so since it is not usually recognised that the "latent" period intervening between the preceding pregnancy and the resulting chorio-epithelioma may vary from a few weeks to months or occasionally even years. Similar prolonged periods of "latency" have been met with in connection with metastases both in sarcomata and cancers, when secondary growths in other situations have appeared many years after the date of extirpation of the primary tumour in various sites. The origin and cause of chorio-epithelioma seem to be clear. It is unnecessary to assume the existence of an internal secretion or the appearance of any other new stimulant to growth. Since Leo Loeb put forward the theory, based upon his experiments, that the ovary furnishes an internal secretion, possibly in connection with the corpus luteum, which stimulates the formation both of the

decidua and of the ectoderm of the trophoblast when the placental growths under consideration arise, much attention has been given by gynæcologists to the lutein tissue and to co-existent lutein cysts of the ovary, without however disclosing any genetic relationship between them and the placental growths. Neither increase of lutein tissue nor lutein cysts have been present in the great majority of such growths, though appearing in a few of them (vide Fig. 99). The natural inherent endowment of vegetative activity of the ectoderm cells of the trophoblast unrestrained by the normal laws usually in action, is sufficient to account for their continuance of growth and the production of the chorio-epitheliomatous tumour. Multiple primary centres of growth, which have apparently been present in some cases, are thus easily accounted for. It is the same explanation as underlies the production of all teratomata.

When cells representative of one or more of the embryonic layers of one individual are included within the tissues of another individual they grow as a parasite upon the latter, and form a monster or a tumour. Their inherent tendency to grow is merely exerting itself. No other cause of growth is necessary. The nature of the resultant growth depends entirely upon the type of the cells enclosed; if all three types are represented, an attempt may be made to produce a more or less complete individual; if one only, the resulting growth can show only tissues derivable therefrom. In the chorio-epithelioma the included cells are representative only of the sac, in which the embryo is developed. They are unipotential, and capable only of producing their own type of tissue. Consequently their activities, however great, never give rise to an individual.

The cause or causes which underlie the onset and production of disturbances of the normal maturation of the ovum and result in the formation of a placental mole, in an abortion and the like are imperfectly known, but they have nothing directly to do with the causation of the chorio-epithelioma, further than that they lead to the retention within the maternal tissues of potentially dangerous fœtal ectoderm cells, without which the chorio-epithelioma cannot arise. Moreover it is easy to see how in some cases of placental mole, in virtue either of less restraint upon the ectoderm cells or of undue retention of the mole, the fœtal invasion of the tissues of the mother may take on the characters of the chorio-epithelioma. In other words, a chorio-epitheliomatous growth would result before instead of after the extrusion of the mole. In this way the few cases of malignant placental mole recorded by Pestalozza and others find an easy explanation.

Fig. 107.

Fig. 108.

Fig. 109.

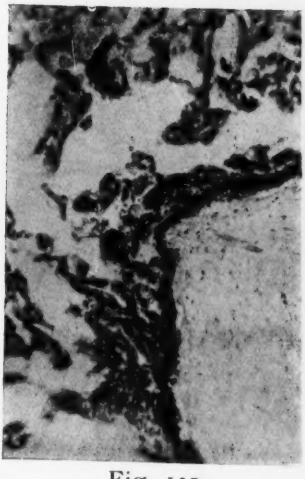

Fig. 110.

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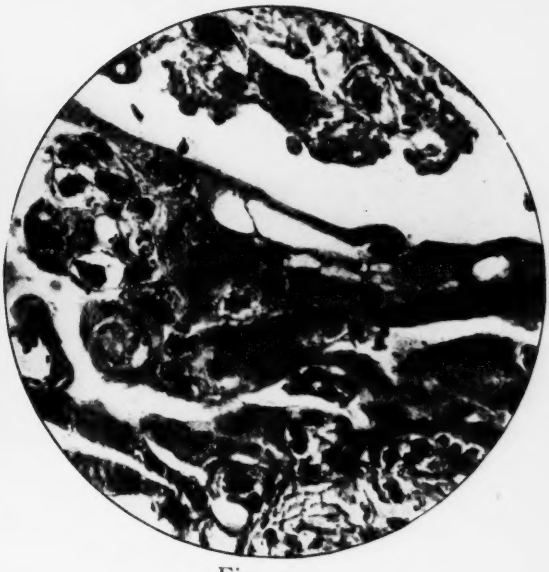
Fig. 111.



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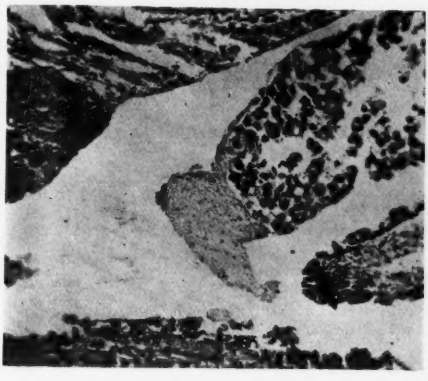

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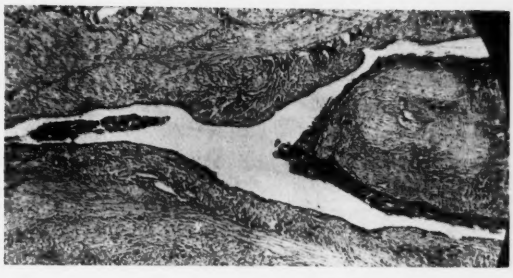

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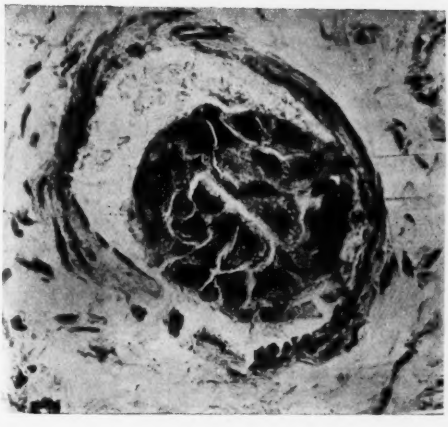

Fig. 115.

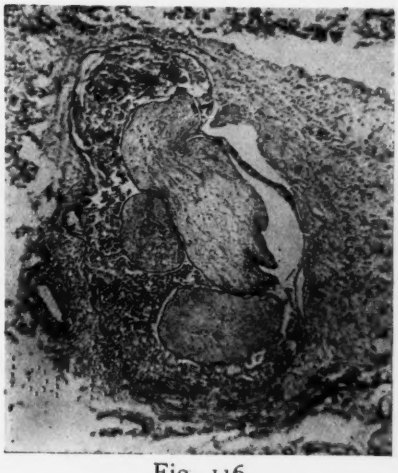

Fig. 116.

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Fig. 117.

Fig. 118.

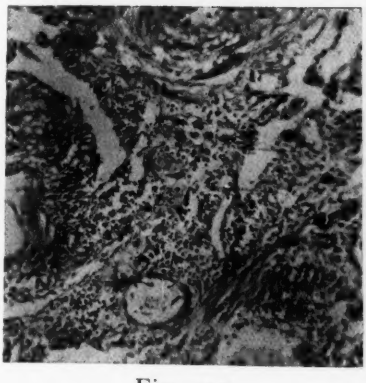
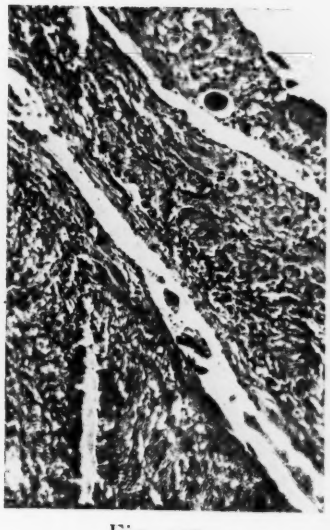


Fig. 119.



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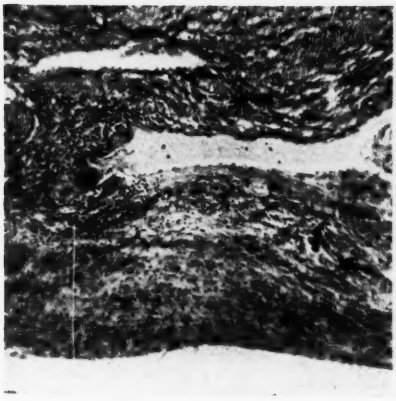

Fig. 121.

Fig. 122.

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DESCRIPTION OF PLATES.

All the illustrations are taken from specimens in the Pathological Museum of the University of Birmingham. They are photographs and photomicrographs taken by the writer with the assistance of certain members of his staff, particularly Drs. Wilson and Hewetson and Mr. J. F. Brailsford. They are all new, not having been previously published, except in the case of Figs. 95, 96, 108, 109, 112 and 122. A short clinical history has been added, wherever possible to the anatomical and histological features so as to increase interest in the cases and relieve the paper itself from many details.

SARCOMATOUS DEGENERATION IN FIBROIDS.

Fig. 41. Section of large fibroid about one-sixth natural size, shewing a dark softened sarcomatous area at its apex. Other parts of the fibroid show œdema and hyaline degeneration. From a woman æt. 57, in whom menopause had occurred at 47. Had suffered for 2 years from attacks of abdominal pain, which had become worse during last 3 months. She first noticed the tumour 6 weeks before consulting Mr. Hewetson. It then reached the umbilicus and felt cystic in its upper part. She enjoyed good health for some time after the operation, but died from multiple recurrence about 6 months thereafter.

Fig. 42. Section of sarcomatous area ×30, shewing cellular structure.

Fig. 43. Similar section ×100.

Fig. 44. Similar section ×250, shewing irregular cells.

Fig. 45. Section of tumour which clinically and microscopically looked like an ordinary fibroid about one-third natural size.

Fig. 46. Section of a part of the middle of the tumour (vide Fig. 45 for part taken) ×50, shewing suspicious cellular focus in typical fibroid tissue.

Fig. 47. A similar focus ×250, shewing cellular mass bordering on and merging into myomatous tissue.

Fig. 48. A similar focus ×250, near the last, shewing a structure still more closely resembling sarcomatous tissue.

Fig. 49. Section of a sarcomatous looking focus in a fibroid ×250, shewing the myoblast type of change. The individual cells are visible, running loosely in bundles. Some of them have two nuclei and there is little or no intercellular substance.

Fig. 50. Section of a similar focus ×250, shewing the individual myoblasts, some with deeply stained nuclei.

Fig. 51. Section of sarcomatous area in cervical region of uterus in case Fig. 14 ×250, shewing multinucleated cells and growth of fibroblast type.

Fig. 52. Section of a vaginal portion of the growth in the same case, shewing multinucleated fibroblast cells and much œdema of the sarcomatous growth ×250.

Fig. 53. Section of a sarcomatous focus suggesting the origin of the cells from the walls of a blood vessel ×200.

Fig. 54. A uterus enlarged by a tumour growth which has eaten its way through the uterine wall and formed a large irregular mass on its outer surface about one-third natural size.

Fig. 55. The same uterus bisected, the cut surface presenting the usual appearances of an ordinary fibroid.

Fig. 56. Section of the tumour at the site of perforation ×50, shewing cells clustering round the blood vessels suggestive of an origin from the vessel sheaths,

the older and external cells gradually undergoing a form of hyaline degeneration, the so-called cylindroma.

Fig. 57. The same section ×250, shewing one of the cellular cylinders cut transversely. The cells immediately around the vascular lumen are larger and more vegetative looking than those further out. Remains of cells and nuclei are still visible here and there in the general matrix.

Fig. 58. Section of uterus shewing one submucous and a very large subserous tumour, the latter measured 12½ inches by 10½ inches by 8½ inches. Several small interstitial fibroids were present which are not shown in the photograph, about one-sixth natural size. The submucous tumour was an ordinary fibroid, but the larger subserous tumour, though mostly resembling a fibroid, had several suspiciously sarcomatous areas, particularly in the cortex. From a woman æt. 62, who complained of a hœmorrhagic discharge, recurring every 3 weeks for the last 6 years and every few days during the last year of this time. About a year ago she noticed a swelling in the abdomen which reached as high as the umbilicus and had greatly increased in size since then. When she consulted Mr. Hewetson, it filled the whole abdomen. She had the appearance of a fairly healthy woman, but had lost some weight. She had no pain.

Fig. 59. Section of one of the suspiciously sarcomatous areas above mentioned ×250, shewing the largely cellular structure, the finely fibrillated matrix and the rudimentary blood vessels. There were many such areas scattered through the tumour which otherwise presented the characteristic appearances of a fibroid of considerable standing, extensively degenerated in places. The cells in the cellular areas were very irregular in shape, with deeply staining nuclei and the appearances were suggestive of a fine fibro sarcoma.

Fig. 60. Anterior view of uterus enlarged by tumours, a little less than ¼th natural size. The mass measured 14×10×9 cm. The largest tumour is irregularly rounded and growing in the anterior wall. Another smaller tumour about 6 cm. in diameter is seen at its lower end.

Fig. 61. Posterior view of same, shewing a third and rounded tumour attached to the second and continuous with the round ligament, which appears to swell out into it.

Fig. 62. Section of the same uterus and of large tumour in its anterior wall, less than one-third natural size, shewing the latter hollowed out into a large cyst, whose walls, thin above but thick below, where both tumour substance and uterine muscle is seen, still show thickening and projections, the remains of former septa. The tumour substance inside the uterine muscle is smooth, shiny or waxy looking, homogeneous and comparatively soft, with some resemblance to raw pork in appearance. It contains smaller cysts of varying size some of which have no connection with the cavity of the large cyst. Similar masses of waxy looking material permeated the substance of each of the smaller solid tumours.

Fig. 63. Section of one of these solid tumours ×50 shewing that the waxy material consists of a cellular growth, the remaining tissue of the fibroid being seen as strands of muscle separating the cellular masses.

Fig. 64. The same section ×250. The growth permeating the fibroid is seen to be cellular with a small amount of a fine fibrous matrix. The cells are irregular in shape and size and of an active vegetative type. Some of them have several nuclei, particularly those bordering upon the walls of the numerous capillaries. The frequency with which clusters of young rounded cells are seen close to the endothelial lining of the capillaries, sometimes indeed replacing the latter, is suggestive of an origin from the endothelial cells either of the vascular lumen or of the perivascular lymphatics and thus that the growth is either an endothelioma or a perithelioma.

Fig. 65. Section of wall of large cyst ×250, shewing the same sarcomatous tissue inside and fibro-muscular tissue outside.

Fig. 66. Section of myomatous part of a vascular and œdematous adenomyoma ×50, shewing the presence of many large, irregular cells with 1, 2 or more deeply staining nuclei lying close to the capillaries and between the muscle cells. They are most abundant in the neighbourhood of the endometrial islands, which are mostly large with a good deal of cellular mucosa around the glands. No distinctly sarcomatous foci were found anywhere in the somewhat enlarged uterus, which was removed owing to the patient having suffered from menorrhagia of 12 months' duration, becoming more severe of late. Pain had also been severe, generally beginning a day or two before the flow. Curetting improved but did not cure matters.

Fig. 67. Part of the same section ×250, shewing many of these large vegetative cells. Are they merely dropsical or inflammatory developments or do they indicate the beginning of a sarcomatous growth?

SARCOMA OF UTERUS.

Fig. 68. The uterus opened to show a large fungating tumour filling up the whole of its cavity; about one-third natural size.

Fig. 69. Section of the tumour shewing its incorporation with the uterine wall and the almost complete filling of the uterine cavity. The section shows a dull grey, homogeneous surface, darkened in many places by various degenerations and by old hæmorrhages. There is a small discrete intramural fibroid in the lower part of the uterine wall.

Fig. 70. Section of the tumour at its base of attachment to the uterine wall ×40, shewing sarcoma to right (the reader's) and cancer to left among the muscular fibres.

Fig. 71. Part of this sarcomatous area ×250.

Fig. 72. Part of the cancer ×250, shewing the typical gland acini of a columnar celled epithelioma.

Fig. 73. The uterus sectioned and thrown open, so as to show the two halves of a large, localised, intramural tumour, presenting many of the appearances of a degenerating fibroid but found on microscopic examination to be a sarcoma (?) about half natural size.

Fig. 74. A section of this tumour ×40, fairly representative of the whole. There are clusters of young cells around the blood vessels, suggesting an origin from their walls. The growth is largely cellular and suggestive of a sarcomatous condition.

Fig. 75. Section of an intramural tumour growing in the anterior wall of the uterus. It was imperfectly circumscribed and bulged into the uterine cavity, which was elongated. It measured 4½ inches in diameter and was not unlike a greatly degenerated fibroid. It had undergone much cystic change, particularly in its apical parts; just under half natural size.

Fig. 76. Section of a portion of this tumour taken from its cystic apical part.

Fig. 77. Section of a portion of the solid lower part of the tumour ×250.

COEXISTENCE OF FIBROIDS AND CANCER.

Fig. 78. Outer surface of uterus with appendages, shewing several small fibroids less than half natural size. There is no appearance of the cancer on the outer surface.

Fig. 79. Section of the same uterus about ½ natural size, shewing a cancerous growth in the fundus. From a single woman æt. 47, who complained of irregular and excessive hæmorrhage of about 18 months' duration, attributed to a fall from a bicycle. The discharge had recently become offensive and a granular red mass was passed lately. There was no pain or other local symptom. The uterine cavity

was explored by Dr. Thomas Wilson and the curettings found to be cancerous (vide fig. 94. The coexistence of cancer and fibroids was diagnosed and the uterus removed by him, the patient being well when last heard of, namely 2½ years after the operation.

For microscopic sections of cancer in this case see Figs. 91 and 94.

CANCER OF THE UTERUS.

Fig. 80. A localised nodular cancer of considerable size in the upper posterior wall of the uterus about half natural size. Post mortem specimen.

Fig. 81. A localised papillary cancer in the lower part of body of uterus about half natural size. The growth had well defined overhanging margins, but did not project much into the interior of the uterus and seemed to invade the muscle only to a moderate extent. At a little distance above it there is a simple glandular polypus. From single woman æt. 67, who complained of a constant watery blood-stained discharge of 5 months' duration. Menstruation had ceased 3 years before. No pain, anæmia or wasting, uterus movable. For microscopic section see Fig. 90.

Fig. 82. A localised cancer taking the form of a malignant ulcer with a granular or villous surface in lower part of body of uterus, just above internal os; about two-thirds natural size. Another small but malignant ulcer is seen at the fundus near one of the cornua. The uterus has unusually thick walls. From a married woman æt. 55, who complained of a constant green discharge of 2 years' durations, which stiffened the linen; also of pain at intervals in right groin. Menstruation had ceased two years before. She was well nourished and of a good colour, though she had recently begun to lose flesh. The uterus with appendages were removed by Dr. Thos. Wilson, after curettings had been pronounced to be cancerous by the writer to whom they were submitted by Dr. Wilson.

Fig. 83. Localised cancer with smooth surface filling up large part of body of uterus, almost diffuse; about two-thirds natural size.

Fig. 84. A diffuse cancer invading the whole uterus and cervix about half natural size. There is also a small discrete fibroid in the anterior uterine wall. The cancer had penetrated the wall of uterus and invaded that of the bladder and caused partial fixation of uterus. From a married woman æt. 47, who complained of a watery and sanious discharge of 12 months' duration and of pain for five years. There was a profuse loss of blood at the time that the pains began, but patient was neither anæmic nor emaciated at the time of the operation.

Fig. 85. Localised cancer in upper part of body of uterus which had undergone extensive necrotic changes; about two-thirds natural size. In great part it had a white or pale yellow appearance suggestive of caseation.

Fig. 86. Section of margin of cancer ×50. Cancerous tubes and spaces are seen to left (the reader's) and below, and normal tubes to the right, the former being more prominent and active looking than the latter.

Fig. 87. Section of margin of cancer ×50, shewing invasion of muscular wall by cancerous tubes to the right of the uterine cavity, and atrophied but otherwise normal endometrium, becoming slightly cystic, to its left, illustrating the same differences in structure and prominence between the two kinds of tubes.

Fig. 88. Section of a cancer ×50, shewing typical tubes lined by columnar epithelium, the structure characteristic of a columnar epithelioma. Most of it is of the so-called inverting type, though the nodule at the upper right corner is of the everting type.

Fig. 89. Lymphatics of the outer layers of muscular wall of uterus distended by cancerous cell growths, the result of cell emboli, ×50.

Fig. 90. Section of cancer ×50, shewing columnar celled spitheliomatous struc-

ture to left and below, and adeno-carcinoma and spheroidal celled carcinoma elsewhere. Taken from case Fig. 81.

Fig. 91. Sections of free surface of a cancer ×250, shewing the typical appearance of villous or papillary processes, which grow out from the free surface of the cancer or into the interior of alveolar spaces. Taken from case Figs. 78 and 79.

Fig. 92. Section of a cancer shewing the so-called keratinoid change in the epithelial cells of the cancer ×30.

Fig. 93. Section shewing the same change; apparent "cell nest" formation ×250.

Fig. 94. Curettings ×30 from case Figs. 78 and 79, shewing irregular alveoli much branched tubes and scanty stroma characteristic of malignancy.

CHORIO-EPITHELIOMA AND PLACENTAL MOLE.

Fig. 95. The uterus has been laid open in front to show the chorio-epitheliomatous growth forming only a small circular projection (about 3 mm. in diameter) into the cavity of the uterus.

Fig. 96. Sagittal section of the same uterus passing through the middle of the chorio-epithelioma. It forms a wedge-shaped growth penetrating nearly half way through the uterine wall. In the fresh state it was of a maroon colour, soft and friable. Above it another smaller but similar area is seen. They are two outlying parts of the same tumour. The uterus measured 11 cm. long, 7 cm. broad and the uterine wall 2 cm. thick. It was removed by Dr. Smallwood Savage by vaginal hysterectomy from a patient æt. 50, whose history disclosed that she had had 8 children, the last 7 years before, a hydatidiform mole extruded 11 weeks before and reappearance of hæmorrhagic discharge, which had begun 7 weeks before and had got worse of late. The patient was quite well when last heard of.

For full description of this case see paper by Leith and Smallwood Savage, "British Med. Journal," 1904, vol. 2, pp. 1391 to 1395.

Fig. 97. Uterus opened from the front shewing nodular, chorio-epitheliomatous growths projecting into the uterine cavity and infiltrating the underlying muscular wall as soft friable dark brown areas. From a woman æt. about 32, who was admitted to the General Hospital, Birmingham, suffering from high fever, rigors and a brown offensive uterine discharge. Chorio-epithelioma was suspected but she was too ill to undergo an operation and died of septicæmia within 24 hours of admission. There was an indefinite history of a miscarriage about 2 months before the date of admission but none of a vesicular mole. The uterus was removed post mortem and the lungs showed numerous small secondary growths: vide Fig. 116.

Fig. 98. Uterus laid open from front shewing a rough nodular growth on posterior wall, a chorio-epithelioma.

Fig. 99. Sagittal section of the uterus with coronal section of both ovaries in the same case. The uterus shews dark maroon coloured, soft, friable masses situated in muscular wall, just external to the endometrium and penetrating only for a short distance into the muscle. The growth is localised to the posterior wall and the apparently separate masses are outlying parts of one growth. Both ovaries shew numerous cysts varying in size from a pea to a Tangerine orange, which were found to be lutein and follicular in nature. From a woman æt. 28, who had been married for 14 months. She had had amenorrhœa of 2½ months' duration, followed by a smart flooding. A month later the uterus reached midway between the umbilicus and the ensiform cartilage. Flooding recurred and a large vesicular mole was evacuated. Intermittent hæmorrhage continued for 1 month when she was admitted to the Women's Hospital, Birmingham, under the care of Mr. Hewetson. The uterus was explored and a chorio-epithelioma accompanied by cystic ovaries was diagnosed. Abdominal hysterectomy was performed and the patient was in good health when last heard of, over two years afterwards.

Fig. 100. Sagittal section of uterus shewing several areas of chorio-epitheliomatous growth in the uterine wall just external to the endometrium. In the fresh state they were soft, spongy and maroon coloured. There were many others, varying in size from a pea to about that of a filbert nut, scattered throughout the myometrium. The cavity is empty owing to a previous curetting. The peritoneal surface, ovaries and tubes were normal. From a married woman æt. 43 who had had neither children nor miscarriages, who was admitted to the General Hospital, Birmingham, because of œdema of legs and abdomen and albuminuria complicating early pregnancy. The uterus was about the size of a 4 months' pregnancy. There was amenorrhœa of 2 months' duration. After being in hospital for about one month, she began to suffer from uterine hæmorrhage and a vesicular mole was expelled. About 4 weeks later irregular uterine hæmorrhage recurred and continued for 6 weeks, when she was readmitted to hospital, curettage was performed and a diagnosis of chorio-epithelioma established, when abdominal hysterectomy was performed. The patient was well when last heard of two years later.

Figs. 101 and 102. Sections of uterus about one-quarter natural size, containing many interstitial fibroids in its wall and a hydatidididiform mole and blood clot in its cavity. From a married woman æt. 42, who reported that she had had a fleshy mole removed one year after her marriage 5 years before the hysterectomy. Menstruation thereafter was regular for a period of $6\frac{1}{2}$ months, when after amenorrhœa for 2 months, a severe hæmorrhage occurred, which was followed by a more or less persistent loss of blood and occasional escape of a currant jelly like substance, for the next 4 months. The uterus was removed by Dr. Smallwood Savage in April, 1909, and the patient when last heard of, considerably more than a year after, was enjoying good health.

Fig. 103. Villi of hydatidiform mole ×30, extruded in case of Fig. 100, shewing the mesoblastic core and epithelial covering, though the differentiation into Langhans' layer cells and syncytial elements is not obvious owing to the low magnification.

Fig, 104. Part of a villus from the same case ×50, shewing the mesoblast core with epithelial covering, plainly differentiated into Langhans' layer cells inside and syncytial elements outside. These are the characteristics of a normal villus.

Fig. 105. Section taken from junction of mole and uterine wall in case Figs. 101 and 102 shewing blood clot below, immediately above which is a villus, penetrating the decidua, running horizontally across the field from right to left and reaching about half way across. Immediately above this is a great thickness of decidua between the villus below and uterine muscle above.

Fig. 106. The same villus ×50, shewing mesoblast core and epithelial covering, blood clot and decidua below and decidua above.

Fig. 107. Villus ×100 of the chorio-epithelioma in case Figs. 98 and 99 seen to be invading the muscular wall of the uterus. The mesoblastic core and both epithelial elements are visible.

Fig. 108. Section taken from near the margin of the large maroon coloured area in Fig. 96, shewing a villus of chorio-epithelioma, possessing fibrous core and epithelial covering, occupying a wide channel below and to the left, surrounded by a mass of blood clot and fibrin, above and to the right ×40.

Fig. 109. Section taken from the same area closer to the muscular wall, shewing a villus, possessing fibrous tissue core and epithelial covering (chiefly of Langhans' cells) penetrating the muscular wall of the uterus ×40.

Fig. 110. Apex of villus ×100 of the chorio-epithelioma in case Fig. 100 shewing the mesoblastic core commencing to degenerate and the epithelial covering still actively vigorous..

Fig. 111. A solid epithelial villus ×30 of the chorio-epithelioma in case Fig. 100. Both epithelial elements are present but there was no trace of a fibrous core. Other villi near it showed cores partly degenerated.

Fig. 112. Section of the tip of a villus ×300 taken from case Figs. 95 and 96 shewing both cellular elements, the syncytial predominating. The latter are seen as large irregular granular masses containing several nuclei and sometimes vacuoles. The Langhans' cells are polyhedral uninucleated usually and stain less deeply.

Fig. 113. Apex of a villus tipped with a little white thrombus invading a large venous sinus in the muscular coat of the uterus. The villus is chiefly composed of Langhans' layer cells. From case Fig. 100.

Fig. 114. Cellular embolus composed mainly of syncytial elements ×20 lying free in cavity of a vein within the muscular wall of the uterus. The tongue of muscle to the right (reader's) between the forked branches of the vein is lined in part by similar fœtal cell penetrating the muscular wall of the uterus ×40.

Fig. 115. Cellular embolus lying free in a vein in the round ligament as far out as the ovary ×250. It contains both syncytial and Langhans' cells. From case Fig. 100.

Fig. 116. Embolus within a branch of the pulmonary vein within the lungs ×50 shewing both mesoblastic core and epithelial elements, proving that portions of the whole thickness of a villus may be detached from the original uterine growth and deposited in a distant organ. From case Fig. 97.

Figs. 117 and 118. Sections taken from two parts of the muscular wall of the uterus in case Figs. 101 and 102 after they had been thoroughly scraped with the finger and the curette by Mr. Hewetson, with the object of determining whether artificial evacuation of a mole with the finger followed by a thorough curetting of the same area could be depended on to free the uterine wall from the invading fœtal elements. In both cases considerable portions of villi, containing both fibrous cores and epithelial coverings, are seen to have been left behind, showing that in some cases of hydatidiform mole, at any rate, the fœtal elements invade venous sinuses within the myometrium too deeply to allow of either natural extrusion or artificial removal. These fœtal remains may be the origin of the chorio-epitheliomatous growths which follow after the extrusion of a hydatidiform mole.

Fig. 119. Section of a chorio-epithelioma ×100 taking from a part of the muscle wall of the uterus beyond the apparent base of the growth shewing syncytial elements (fine rootlets of the growth cut across or emboli) burrowing among the muscle in making their way to the veins.

Fig. 120. Section of a similar part of a chorio-epithelioma ×150 shewing syncytial elements burrowing in the walls of the veins and making their way into the lumen.

Fig. 121. Section of a similar part somewhat further into the uterine wall ×150 shewing syncytial elements in the process of penetrating the left end of the vein in the centre of the field .

Fig. 122. Section taken from the uterine wall towards the peritoneal surface in the case of chorio-epithelioma shewn in Figs. 95 and 96 stained by Weigert's elastic tissue method. It shews a large syncytial element (below and to the left of the lumen) in the process of leaving the lumen of a large vein and burrowing its way through its wall into the surrounding tissue. It had travelled to its present site as an embolus, become fixed, and in a degenerated condition is leaving the vessel again.

SELECT CLINICAL REPORT.

(Under this heading are recorded, singly or in groups, cases to which a special interest attaches either from their unusual character or from being, in a special sense, typical examples of their class).

The Pelvis with Congenital Absence of the Sacrum.

By Clifford White, M.D.

This specimen was shown at the meeting of the Obstetrical and Gynæcological section of the Royal Society of Medicine, May 11th, 1911.

This condition in the fœtus has been called by Taruffi[1] "Fœtus Acocono-lecanus" and is in man a rare abnormality. The example here recorded was obtained from a full term male fœtus of normal size. The mother's history is unimportant. She was a healthy woman aged 39, who had had eleven healthy full-term children; no miscarriages. There was slight accidental hæmorrhage during the fourth month of the pregnancy which was otherwise normal. There was no history of trauma. The child presented by the breech and was still born owing to retention of the head in the vagina. It was not a twin pregnancy. The placenta showed no gross change but the fœtus had the following obvious malformations:—

A hernia of small intestine extending three and a half inches into the umbilical cord.

Imperforate anus with absence of the lower part of the rectum.

Double talipes equino-varus.

On dissection the condition found was as follows:—

The head and thoracic viscera were normal.

The left lobe of the liver was divided into two parts by a deep groove on its under surface.

An accessory spleen was present.

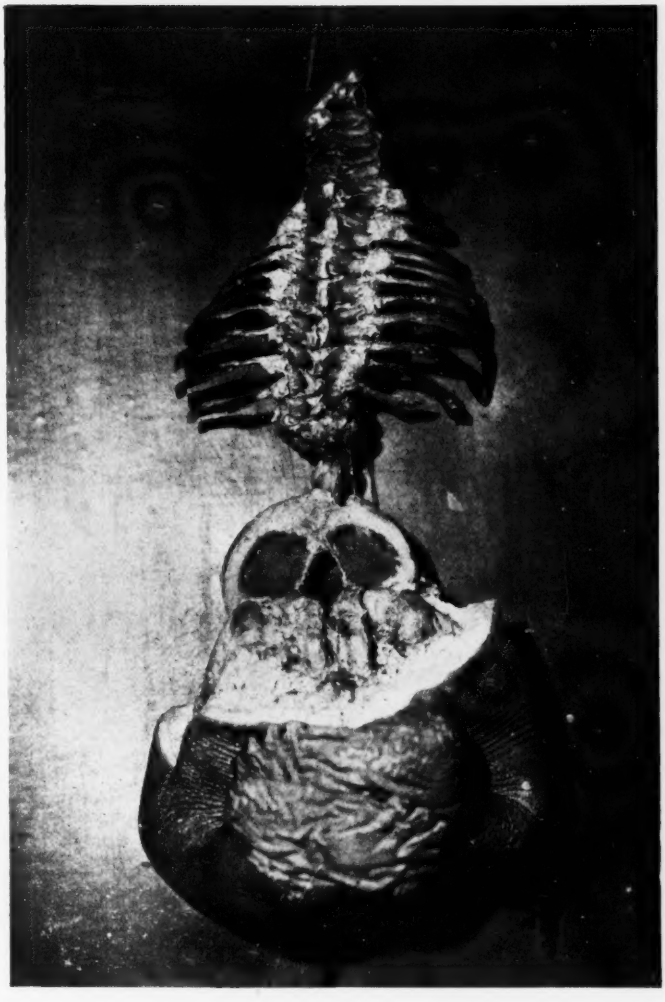
The stomach was normal and most of the small intestine was in the sac of the umbilical hernia.

The large intestine was distended with meconium and ended at the level of the left iliac fossa in a fibrous cord which terminated behind the bladder.

The kidneys were represented by a median kidney bearing two supra-renals which measured 3·3 cms. long.

The ureter on the right side was normal; the left was a fine impervious cord running down to the bladder.

The urethra opened into the bladder which contained urine.



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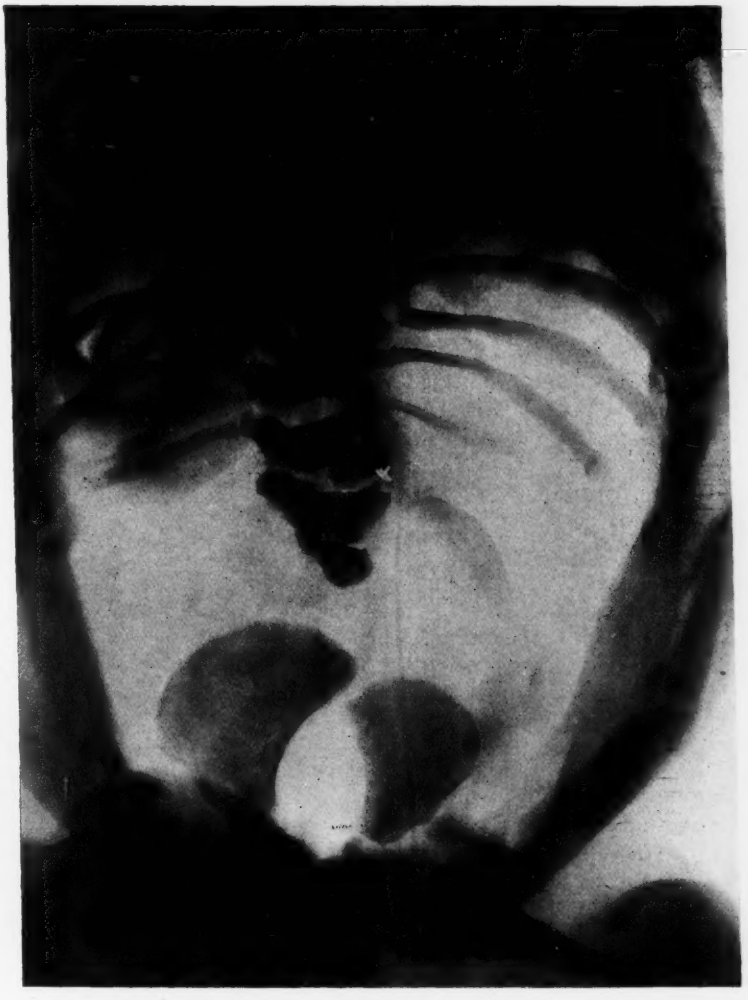

Radiogram to show termination of vertebral column above level of Ilia. The shadow below and to the left is from the soft parts which had not been removed when the radiogram was taken.

The left testis was in the scrotum but the right was attached to the right iliac fossa by a fold of peritoneum comparable to the broad ligament. Microscopic sections, however, show the structure of normal testis and epididymis. The left vas was normal but careful dissection failed to show any trace of a vas on the right side. From the lower pole of the right testis a fibro-muscular band [probably gubernaculum] ran to the connective tissue of the groin.

The spinal nerves were abnormal owing to the irregularity of the spinal column, but their softness prevented proper dissection; a large nerve trunk issued from a plexus in the lower dorsal region and ran down to the thigh, apparently representing the anterior crural and great sciatic nerves. Sections of the muscle of the thigh show normal muscle bundles.

The bones of the head, limbs, shoulder and pelvic girdles are normal.

The vertebral column is in a chaotic state so that identification of parts is not easy. The parts present are shown in the table.

Rib.	Right.	Laminæ.	Left.	Rib.
—	Normal	Atlas	Normal	—
—	Normal	Axis	Normal	—
—	Two laminæ present	3rd Cervical	Normal	—
—	Normal	4th Cervical	Normal	—
—	Normal	5th Cervical	Normal	—
—	Normal	6th Cervical	Normal	—
—	Absent or represented by the double lamina of 3 C	7th Cervical	As on right side	—
1st Rib	Normal	1st Dorsal	Normal	1st Rib
2nd Rib	Normal	2nd Dorsal	Absent	—
3rd Rib	Normal	3rd Dorsal	Normal	2nd & 3rd Ribs
4th & 5th Ribs	Fused	4th Dorsal	Normal	4th Rib
		5th Dorsal	Normal	5th Rib
6th Rib	Normal	6th Dorsal	Normal	6th & 7th Ribs
7th & 8th Ribs	Fused	7th Dorsal	Fused with 6	—
		8th Dorsal	Normal	8th Rib
9th Rib	Normal	9th Dorsal	Normal	9th Rib
10th Rib	Normal	10th Dorsal	Normal	10th Rib
11th Rib	Normal	11th Dorsal	Normal	11th Rib
Absent	Normal	12th Dorsal	Normal	Absent

Below the 12th Dorsal vertebra there are only two cartilaginous nodules, the upper measuring 2·2 cms. across and 1·5 cms. from above down. The lower nodule measures 1·3 cms. across and 1·5 cms. from

above down, the upper piece is partly ossified. The lower mass articulates by a synchondrosis with the left iliac bone, which is thickened in the region of the ilio-pectineal line to receive it.

The right iliac bone is not in contact with the vertebral column at all but is attached by ligaments. The lower three lumbar vertebræ and the whole of the sacrum and coccyx are thus entirely absent.

The true pelvis is represented by the innominate bones which approach each other within 2 mm. in the region of the ischial spines. The ischial tuberosities are 6 mm. apart, and the widest part of the iliac crests measures 5·3 cms. across.

The space between the ilia posteriorly was covered by a large pad of subcutaneous fat.

The condition of the centres of ossification is shown in the radiogram. It will be noticed that the lower nodule which is in contact with the left ilium does not contain any ossific centre.

According to Taruffi this condition is fairly common in the calf and pig, but he records no case in a human fœtus in his book.

Ballantyne [2] states that the sacrum is usually absent in sympodia, the same authority has published an interesting case [3] of an acardiac twin in which no vertebral column at all was present and the pelvis was represented by the two innominate bones which were in close contact posteriorly. No muscle could be demonstrated in the legs, adipose tissue only being present.

Luton [4] described a somewhat similar case in an allantoido-angiopagous twin (quoted by Ballantyne).

Litzmann's [5] case is unique in that his patient reached adult life and became pregnant three times. She was delivered of still-born children by forceps on each occasion, and died of peritonitis from rupture of the uterus after her third confinement. At the autopsy it was found that the sacrum was only represented by a semi-circle of bone measuring only 1·4 × 1·5 × ·7 cms. The pelvic measurements of the patient were inter-spinous 20·2 cms, inter-cristal 21·6 cms., conjugata vera 11·6 cms. and transverse (of brim) 10·5 cms. This patient was one of twins. The transverse contraction in this case was not as great as might have been expected from measurements of the Robert and Naegele pelves, and the difficulties of delivery do not seem to have been very great, as Litzmann states that the second child weighed 3·5 kilos, and forceps was applied on account of prolapse of the cord. In this connection it may be noted that Galabin [6] has drawn attention to the greater space which partial absence of the sacrum gives behind, and records a delivery with the cephalotribe through the posterior half of the outlet of the pelvis in such a case.

C. C. Wertheim [7] described a female fœtus (one of twins) in whom the vertebral column ended at the last lumbar vertebra. The sacrum was absent but a tumour, the size of a fœtal head, formed of cysts containing blood separated the ilia from each other. Bland-

Sutton[8] quotes a case where a woman at the eighth month was delivered of a child whose development below the umbilicus was that of a five-months' fœtus. Dissection showed that the spinal column ended at the first lumbar vertebra; the remaining lumbar and sacral elements being absent. In this case also the muscles of the legs were replaced by adipose tissue. Cibert and Tarricot[9] have recorded a case where the whole pelvis and legs were absent.

The case now recorded is exceptional in that the child was not one of twins and that the leg muscles are present.

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REVIEWS OF CURRENT LITERATURE.

UNDER CHARGE OF EARDLEY HOLLAND, M.D.

LIST OF COLLABORATORS:

LONDON. Alban Doran, F.R.C.S.; S. Jervois Aarons, M.D.; J. Barris, M.B.; A. L. H. Smith, M.B.; F. E. Taylor, M.D.; C. White, M.D.; J. A. Willett, M.D.
EDINBURGH. Miss J. H. Filshill; R. W. Johnstone, M.D.; James Young, M.D.
GLASGOW. E. H. L. Oliphant, M.D.
ABERDEEN. W. R. Pirie, M.B.
BIRMINGHAM. Frederick Edge, M.D.; H. B. Whitehouse, M.S.
MANCHESTER. W. Fletcher Shaw, M.D.
SHEFFIELD. Miles H. Phillips, M.B.
CHELTENHAM. C. J. N. Longridge, M.D.

Classification of Hermaphroditism.

POZZI (*Revue de Gyn.*, March, 1911), discusses the classification of these unusual cases. He finds fault with Kleb's classification which was made before the embryology of the parts was known.

He suggests the following table in which andro-gynoïdes refer to true males and gyn-androïdes to true females.

ANDRO-GYNOIDES.

Regular :—
Normal vulva but testes demonstrated histologically.
Irregular :—
Perineo-scrotal hypospadias and clitoris-like penis, but testes demonstrated histologically.

GYN-ANDROIDES.

Regular :—
External genitals normal—penis containing urethra—vulva absent. Ovaries demonstrated histologically.
Irregular :—
Aplasia of the vulva and vagina. Penis-like clitoris. Ovaries demonstrated histologically.

References to actual examples of each class are given. C. W.

Three cases of Pseudo-hermaphroditism.

POZZI (*Revue de Gyn.*, March 1911) gives details of nine cases of pseudo-hemaphroditism which have come under his personal observation. Three of the cases have not been previously published. They all seem to be examples of hypospadias with cleft scrotum, two out of the three were in infants, the third was an adult, aged 43, who was said to menstruate through the perineal aperture of the urethra, but a rectal bimanual examination failed to show any sign of uterus or

vagina. Although the author regards all three cases as males, there is no proof given that this is the case, as the genital glands have not been examined histologically.

The article is well illustrated, and some remarks are made regarding the sexual inclinations of these patients. C. W.

Hermaphroditism.

Tuffier and Lapoint (*Revue de Gyn.*, March 1911) record an interesting case and also go into the varieties and psychology of this condition in some detail. The patient, aged 20, was seen on account of a swelling in the left labium majus which she wished to have removed as she was about to be married. The swelling had appeared in the groin 10 years before and gradually made its way into the labium. It caused no symptoms. A similar but smaller swelling had recently appeared in the right groin.

On examination the mass in the labium was like a testis and an epididymis could be felt behind it and traced into the inguinal canal. No hernia was present. The tumour on the right side was also like a small testis on palpation. Apparently just to confirm the diagnosis, an incision was made in the left labium and a well-formed testis with a hydatid of Morgagni was found, and part removed for microscopic examination. The external genitals consisted of a cleft scrotum, and a clitoris or penis, 3 centimetres long. A glans was present and was covered with a prepuce, except below where the prepuce ran downwards and backwards to fuse with the cleft scrotum. Thus an almost perfect imitation of labia minora was obtained. On the under surface of the glans a depression was present which ran down and ended in a tract which represented the urethra. No vaginal orifice was present and no vagina could be demonstrated between the bladder and the rectum. Rectal bimanual examination under anæsthesia gave no sign of either uterus or appendages; a small nodule was present just anterior to the lowest part of the rectum, and which it is suggested may have been comparable to the prostate. Microscopic examination of the piece of the testis showed seminiferous tubules separated from each other by a thick layer of connective tissue, the cells lining the tubules were degenerated, in only a few places could spermatocytes be made out, and no spermatozoa were seen. As far as the genital glands go, this patient was undoubtedly male, but the other characteristics were in every way feminine. She had been employed as a mannequin in a dress-maker's shop, and when 17 years of age had her head painted when acting as an artist's model.

There was no hair on the face, that on her head was 60 centimetres long, the larynx was of the usual female type as was her voice. The breasts were very well developed with well formed areolæ and erectile nipples. The gluteal regions were large, the pelvis (which was measured by radiography) was oblique but female in type. The knees and feet were entirely like a man's.

This characteristic of the lower limbs is well shown in photographs which illustrate the article. In ideas, dress and sexual desires she continues to be like a normal woman, although her condition was explained to her a year before.

C. W.

An Enormous Cyst of Urachus: Extirpation and Recovery.

T. L. Macdonald, Washington (*Annals of Surgery*, vol. xlvi, 1907, p. 230), adds to the literature of urachal cysts in the female, a case which seems to have escaped the notice of writers in British medical newspapers since its publication four years ago. A single woman consulted him for extreme distension of the abdomen which had commenced in the region of the bladder and extended upwards. There were pressure symptoms, and the tumour projected forwards,

yet there was but little bulging at the flanks. The cyst was laid open and many pints of clear fluid came away, then about a third more which was turbid, and thick cheesy masses followed. Nodular outgrowths sprang from some parts of the inner wall; they proved to be papillomata and not malignant growths. The cyst was entirely in front of the peritoneum. Posteriorly it was strongly adherent to the parietal peritoneum to which the adjacent abdominal viscera were firmly attached. Their separation proved very difficult, they were followed deeply into the pelvis in all directions. The operator then severed "the firm fibrous attachment to the bladder" and the sac came away; the vermiform appendix, acutely inflamed, was excised. The cyst had reached as high as the ribs, when it was removed not a vestige of normal peritoneum was visible, except on the anterior surface of the stomach. The abdominal contents, including the uterus Fallopian tubes ovaries and bladder could be seen outlined to the thin raw film of parietal peritoneum to which they were attached. The abdominal cavity was filled with normal salt solution and the parietes closed with three layers of absorbable sutures, without drainage. The salt solution was not absorbed; it became purulent and was let out on the seventh day. Drainage and irrigation were practised for a week and the patient recovered. [Clearly a preperitoneal papillomatous cyst and the "firm fibrous attachment to the bladder" was strong evidence in favour of the theory that it was of urachal origin. But cysts originating in the broad ligament sometimes become preperitoneal.—*Rep.*]. A. D.

Ovarian Dysmenorrhœa at Puberty: Blood Cyst of Ovary.

Mériel (*Comptes Rendus de la Soc. d'Obst. de Gynéc. et de Pœdiat. de Paris et de la Soc. d'Obstét. de Toulouse*, vol. xiii, No. 2, March 1911) was consulted in the spring of 1909 about a girl aged fourteen who had menstruated for the first time five months previously, a few drops of blood coming away within twelve hours. Since then there had been regular molimen with much pain but no show, and a swelling developed in the right iliac fossa. There was no pain between the periods. Mériel found that the swelling was distinct from the body of the uterus and suspected hæmatosalpinx. For several months the molimen with pain appeared regularly without any trace of hæmorrhage, and the tumour increased in size steadily. At the eighth period an attack of peritonitis occurred. When it had subsided Mériel explored the pelvis. The vagina and uterus were unobstructed; under the circumstances the swelling still appeared to simulate a hæmatosalpinx. Mériel operated when the ninth period after the initial show was due. He removed an ovarian cyst of the size of the uterus at the sixth month. It adhered strongly to the parietal peritoneum, omentum and ileum. The pedicle showed no sign of axial rotation; it was divided and the cyst was found to contain dark blood mixed with fibrin. Under the microscope there were no signs of development of a cystic adenoma of the ovary, the cyst seemed to be undoubtedly a hæmatic or blood cyst such as has been described by Jayle. The right Fallopian tube was not distended nor atresic at the uterine end. The left ovary showed no sign of disease of any kind and the uterus was quite healthy. After removal of the right ovary the tenth period appeared ten days late, but there was no pain and the show was free. From that date the catamenia appeared with perfect regularity; the report of the case was read over a year after the re-establishment of normal menstruation. Mériel dwelt on the apparent suppression of the functions of the healthy left ovary during the evolution of the blood cyst. Ferré of Pau, in discussing the case doubted that the abeyance of function in the normal ovary had a special cause in this instance. During the establishment of the catamenia at puberty very slight disturbances, or a mere change of habits, diet or residence may be followed by amenorrhœa, or molimem without show

for many months. Audebert remarked that the precise significance of the normal amenorrhœa of pregnancy is not known. A corpus luteum develops, just as in Mériel's case a follicle in the right ovary underwent a marked though pathological evolution. The opposite ovary in that case was possibly subjected to some inhibition, as Mériel suggested.

[See Jayle "Pelvic Hæmatocele from Rupture of Blood-cyst of Ovary," JOURNAL, Vol. xvi, p. 50, and "Retro-Uterine Hæmatocele Resulting from the Rupture of a Small Hæmorrhagic Cyst of the Ovary," *ib.*, Vol. xvii, p. 55.—*Rep*].

A. D.

Adenomyoma of the Ovarian Ligament.

FRANKL (*Zentralbl. f. Gynäk.*, No. 14, 1911) recently exhibited before the Vienna Obstetrical and Gynæcological Society a new growth hardly the size of a pea lying in the middle of an ovarian ligament. It was encapsuled by muscle cells running in a circular manner, its nucleus or innermost portion was also muscular tissue. Glandular structures formed the essential part of the growth, they lay within trabeculæ of connective tissue fibres which ran in the direction of the long axis of the ligament. Frankl, in demonstrating the specimen, dwelt on the totally different origin of the ovarian and the round ligaments. Embryologically they had nothing in common. He laid stress on the frequency with which glandular tissue and glandular growths had been detected in the round ligament whilst they had rarely been discovered in the ovarian ligament. He ascribed the adenomatous tissue in the specimen which he exhibited to the medullary cords. It appears that Frankl will shortly publish in full his views on the genesis and pathology of the ovarian ligament.

A. D.

Diagnosis of Ectopic Gestation.

A. WATSON (*Australasian Med. Gazette*, Nov., 1910) discusses the conditions which may be mistaken for ectopic gestation.

1. Hæmorrhage into the ovary, either into a pre-existing cyst, or into the stroma of the ovary (hæmatoma). Both of these conditions are comparatively rare.

2. Hæmorrhage into the tube. Of sactosalpinx hæmorrhagica there are two distinct varieties. The commoner is produced as the result of a mild inflammatory process which occludes the abdominal ostium of the tube and allows of the retention of the secretion. As a result the tube becomes dilated and thinned, and contains dark reddish-brown fluid, destitute of clots and of cells of chorionic origin. Sooner or later such a tube drops backwards and becomes adherent, the whole forming a tender fixed mass which closely simulates a tubal gestation. The second variety is produced by torsion and the blood is found in the walls and vessels and not in the lumen. The ovary escapes as the twist occurs external to the pelvic pole of the ovary and not at the isthmus of the tube. The anatomical pecularities which tend to produce this condition are an unusually long ampulla associated with a parovarian cyst in the outer margin of the mesosalpinx. The symptoms produced by torsion are very acute and the torsion is usually preceded by some violent effort.

J. A. W.

Pregnancy in Uterus Bicornis.

HAMILTON MARSHALL (*Australasian Med. Gazette*, Oct. 1910) reports a case of pregnancy in the uterus bicornis unicollis of a primipara, æt. 19. It was noted

during pregnancy that the uterus was markedly displaced to the right, and that when it contracted a semisolid tumour, attached to and continuous with it, appeared. This second tumour was about half the size of a five months pregnant uterus. During relaxation of the pregnant uterus the tumour disappeared. During the early part of the first stage of labour the membranes, though intact, never bulged; later their protrusion was normal. The child was born naturally, but there was troublesome hæmorrhage during the third stage. Expression failed to remove the placenta and it was noticed that a part of the membranes which were to be seen at the vulva receded during the attempt at expression. On introducing the hand to remove the placenta it passed into a cavity about the size of six months pregnant uterus containing membranes but no placenta. The opening of this cavity was above and to the left of the os. A similar but rather larger cavity was situated to the right, which contained the placenta.

The author calls attention to the several interesting physical signs in this case, and suggests that the non-protrusion of the membranes during the early part of the first stage was due to their escape into the non-pregnant horn until the head had descended sufficiently to shut off the entrance into it, and that the ascent of the membranes noticed during the third stage at attempts at expression was due to the fact that this manœuvre caused ascent of the left non-pregnant horn in which the membranes were imprisoned. J. A. W.

Myelitis and Neuritis during Pregnancy.

Job (*Annales de Gyn. et d'Obstét.*, March 1911) reviews this subject and reports a case. His patient was a primipara, aged 31 years. During the sixth week of her pregnancy, September 15th, 1910, morning vomiting commenced. It was not severe at first, but by November it became uncontrollable, and the general health of the patient suffered. At the beginning of December she complained of headache, pains in the legs, amaurosis and palpitation. On December 18th she was admitted into the Nancy Maternity Hospital. "On admission," slight jaundice, temperature 99, pulse 120, tongue dry and foul, urine scanty and containing a small quantity of sugar and albumen. The muscles of the legs were atrophied and tender on pressure, voluntary movement was possible, but very weak.

Labour was induced on 19th, and she was delivered of a living fœtus on the 21st. The vomiting then gradually got less, but the pains in the limbs increased. Incontinence of both urine and fæces was present by January, 1911, and the upper limbs also began to be affected; an acute ascending myelitis was diagnosed. The patient died on January 29th. For some days before death muscular tremors had been marked; the small muscles of the hand had atrophied, but slight movement was possible in each limb, sensation was only very slightly affected, the eye symptoms had cleared up and the mind was clear.

Autopsy.—Liver slightly fatty, enlarged; kidneys, healthy; uterus, normal; left ovary, normal; right ovary contained a small dermoid cyst; brain, not examined; spinal cord, no meningitis present. The spinal cord and part of the sciatic nerve were examined microscopically. The ganglion cells of the cord were markedly degenerate, and Nissl's granules had broken up. Transverse sections of the cord showed some degeneration of the posterior columns. The sciatic nerve showed Wallerian degeneration. The author has collected notes of 16 other cases. C. W.

Tuberculosis and Pregnancy.

Prof. Schauta (*Monats. f. Geb. u. Gyn.*, Bd. 33, Heft 3, S. 265).—The following questions require answers with regard to this important subject :—

1. Does tuberculosis advance more rapidly during pregnancy?

2. Are we able to combat the advance of tuberculosis during pregnancy by means of diet and hygienic measures?

3. Is the early induction of abortion capable of favourably influencing the course of tuberculosis?

In the first place be it noted that all cases referred to are those of undoubted tubercle clinically examined and diagnosed with certainty either of lungs or of larynx. By far the larger number of clinicians hold that the disease progresses quicker in pregnancy; thus Heimann has collected statistics from a number of writers which show that the condition becomes worse in 73·4 per cent., while 45·9 per cent. of affected pregnant women die. Old cases which have been quiet for considerable periods relapse in 68 per cent. of the cases (Fellner-Schauta). Pradella gives figures which are even less favourable.

The causes of this unfavourable effect of pregnancy have been variously stated; thus alterations in the circulation, increased work of the heart, lung compression from limitation of movement, diminution of the number of hæmocytes, and digestive disturbances as anorexia, vomiting, insufficient assimilation of nourishment. The mischief is most apparent some weeks or months after the confinement and it is generally recognised that the disease progresses rapidly during the puerperium (in cases which have been allowed to proceed to time).

It has been noticed (Hofbauer. etc.) that pregnancy exerts an influence on the normal mucosa of the larynx causing redness and swelling, so that drifting from physiological to pathological conditions is not unlikely.

Experimentally it has been shown that pregnancy occurring in tuberculous guinea-pigs distinctly shortens life.

A few authors affirm that the advent of pregnancy may improve the condition of the tuberculous subject and probably here as elsewhere exceptions may prove the rule; others again deny that it has any unfavourable effect.

With regard to the second question. In a large number of cases the question is unanswerable. It is quite impossible to carry out sanatorium treatment for the vast mass of the working and labouring classes, and thus it cannot be denied that social influences have to do with the evil effects of tuberculosis in pregnancy, still even in the case of women who have been able to afford such treatment the results with few exceptions have not been very encouraging.

The German sanatoria have given as their results that only one fourth of those treated have been capable of doing remunerative work ("erwerbsfähig") after four years. If one considers such a case as being a "cure" which certainly is not always so, then the best that so far can be done in the case of national tuberculosis is that 25 per cent. are healed or even less. The national sanatoria exclude pregnant cases as a general rule inasmuch as they admit only such sick as have a good prognosis.

There are published results of Norwegian observers which are of interest. Albeck observed 19 cases, in a private sanatorium for the better class, of 16 women who finished their pregnancy; 6 died within a year and a half: Essen Möller records a number of cases in pregnant women slightly affected and treated in a sanatorium with 50 per cent. of deaths or serious advancements.

In women of the best class, the outbreak of the affection is traceable in 29 per cent. to matters connected with generation (Turban).

Similarly it is shown that under the very best circumstances the mothers die and the offspring remain weakly and sickly and rarely reach 20 years of age.

Kalabin recommends the use of tuberculin during pregnancy, from the result of one favourable case; furthermore he has treated 61 cases in good circumstances without bringing on premature labour and has got good results. The third question now falls to be answered, and one must observe a sharp distinction between pregnancy in the first months and in later months. In advanced pregnancy and

in severe cases interruption of pregnancy can have significance only as regards the child, so far as the mother is concerned it simply hastens the feared puerperium.

According to Pradella induction of labour produces a curative effect in tuberculosis of the first stage in 89 per cent., of the second stage in 83 per cent., of the third stage in 25 per cent. Here we are dealing with all degrees of pregnancy durations. If we take cases where abortion was employed in the first months the results are better, thus the same authority gives 91 per cent. successes in the first stage. If then one bases the correctness of the procedure upon the answer to the question "Can tubercle be cured by this method," the answer is "Certainly and it is justifiable to bring on abortion in tuberculosis." Although the French deny the truth of the statement, still it seems certain that improvement or cure may be begun by interruption of pregnancy.

Kaminer requires three years of observation of a case after abortion before certainty of cure can be spoken of. He himself has not seen certain cure, and he holds that abortion acts in the way of improvement limiting the progress of the disease. He recommends the procedure in the first stage of tuberculosis, while he expects no success in the second or third stages and has seen rather rapid advancement.

The position of the medical world with regard to the question of abortion may be stated thus.

There are three groups: first the French school which admits the unfavourable effect of pregnancy on tubercle, but declines to induce abortion, and expects success from dietetic and hygienic measures. The second group consists of those who treat their cases individually and induce abortion if the tubercle is advancing, but if it is not, use general treatment.

The third group considers tubercle in pregnancy an indication for abortion.

The author then goes on to discuss the opinions held by the leaders in each of these groups, pointing out that most Germans hold with the second group, and that he himself did so in a discussion at home in 1902.

One interesting minor point emerges here. E. Martin considers a positive ophthalmo-reaction in tuberculous pregnant women to be a favourable sign as showing the presence of a sufficient quantity of antibodies to protect against the evil influences of pregnancy; in such cases the pregnancy should not be interrupted, but at the same time he admits that one cannot certainly count on success. Kaminer holds that at the present time one cannot use this procedure as a safe guide.

Slight cases, latent or stationary cases, without loss of weight or laryngeal complications may suddenly light up during pregnancy at a time when it is too late to think of inducing abortion and thus more and more the tendency is to lay down a hard and fast rule which the author does as follows:

"We are of the opinion that in every case where tuberculosis is definitely diagnosed, the indication is to bring on abortion, inasmuch as in at least three-quarters of all cases the disease advances during pregnancy, and as the time of this advancement is uncertain one may proceed to treat it too late. It is preferable to sacrifice the life of the child which is in any case of doubtful value in the conditions present. Sanatorium treatment is of doubtful value and attainable only in a very marked minority of cases. Interruption of pregnancy in the second half of its duration is valueless, and not infrequently harmful and can be considered only in the interest of the child in rare cases where the mother is in a hopeless state."

The author then describes the various methods of procuring abortions and recommends anterior hysterotomy.

Next comes the question of sterilisation in addition; some employing tube sterilisation, some total extirpation with removal of the adnexa and so on. Sterilisa-

tion is advisable because tuberculous women show great fertility and Schauta has had to induce abortion twice or three times in a year in some of his cases, and for some years has ligatured the tubes, a method which is easy to carry out and permits of reconstruction of patency of the tubes later on if the case becomes cured or remains long latent. W. R. P.

Should patients rise early after delivery?

H. Pruska (*Monats. f. Geb. u. Gyn.*, Bd. xxxiii, Hft. 3, S. 331).—Since 1894 Küstner has systematically treated his puerperal patients on the lines of early rising: that is to say that if they were well and had not required instrumental delivery or operative interference, they were encouraged to get up on the fourth day. The method has been criticised favourably and otherwise, and some have adopted the idea so enthusiastically that they urge rising on the first day, and particularly insist on the benefits which weakly anæmic, or cardiac and nephritic patients obtain by rising as early as possible in the puerperium.

Rubeska has carried out the idea in his clinic in Prague since 1907, and Pruska as assistant there has had opportunities of observing and tabulating the results.

Until the fourth day after confinement no patient is permitted to get up, and when they do rise they must do no manner of work. On the fourth day they may rise, if they have not required perineal suture, if they feel well and have a regular pulse and normal temperature on that day, even if they have been forceps cases, or although they have granular colpitis (usually of gonorrhœal origin).

If the temperature rises after the patient has left her bed, or if marked acceleration of the pulse appears, she is promptly put back to bed and kept there till all is normal. He has compared the results of this method with an equal number of cases allowed to rise on the ninth day, who nevertheless were quite well enough to have risen on the fourth day.

The questions he wished to answer are:—

(1) What are the effects of early rising on the production of fever, etc.?

(2) On the involution of the uterus, etc.?

(3) As to the production of thrombosis or embolism?

(4) As to retroflexion?

(5) On the general condition of the woman?

His results are given in tabular form, and stated very briefly he finds that in 1,000 women who got up on the fourth day 5·8 per cent. became febrile to a lesser or greater extent as compared with 10·5 per cent. in cases kept in bed till the 9th day. He considers the benefit to be due to the lesser likelihood of retention of the lochia. The second question is with regard to the effect on involution. He finds that the uterus, as judged by its condition on the tenth day when the patient is leaving the clinic, becomes smaller more gradually when the patient is allowed up early, while on the other hand the lochia tend to become more quickly colorless. Taking these two factors together he judges that involution is not interfered with.

With regard to thrombosis and embolism, these in the author's opinion are less likely to occur when early rising is adopted under the conditions already set forth, but further investigations are required to settle this question.

Küstner holds that getting up early is prophylactic against retroflexion, while others consider that no significance can be attached to it since retroflexion comes on 3 or 4 weeks after delivery. Pruska found no example of the condition in his cases.

As regards the general condition of the patients he agrees with Küstner that they feel much better, livelier, and stronger, when they rise on the fourth day than when bed is kept till the ninth day. The good effects are evident on the condition of the bladder and bowels which act much more readily and efficiently.

W. R. P.

REPORTS OF SOCIETIES.

ROYAL SOCIETY OF MEDICINE.

Section of Obstetrics and Gynæcology.

Meetings held February 2 and 8 1911, The President (Dr. H. Macnaughton-Jones), *in the Chair.*

Discussion on Dr. Amand Routh's paper on

The Indication for, and Technique of Cæsarean Section and its Alternatives in Women with Contracted Pelves who have been long in Labour and exposed to Septic Infection.

which will be found on page 235 (February 1911) of the Journal.

Dr. Hastings Tweedy congratulated Dr. Amand Routh on his valuable communication, which was quite worthy of the great school of obstetrics in London.

If streptococci were demonstrated in the uterus, and if their presence was associated with rising pulse and temperature, it seemed to him that their duty was clear, namely, the quick delivery of a living child and the total removal of the affected uterus. Such an operation could be quickly and safely accomplished, and could be made free from the danger of further contamination during its performance.

In suspect cases, where bacteria cannot be demonstrated, the operation of hysterotomy offered many advantages over that of Cæsarean section. The objections to it were unpractical. Cellular tissue need not, and should not, be opened to a greater degree than that which obtained in any ordinary abdominal section. The delivery of the child could always be made an extraperitoneal operation. The peritoneum was not more injured than in supravaginal hysterectomy, and displacement of the bladder would not occur when the operation was properly performed. The incision passed through the thinned-out cervix, and extended almost down to the external os, through tissue relatively free from blood-vessels and lymphatics. If suppuration followed, the pus would find its way into the vagina, and not into the peritoneal cavity. The weakened scar due to suppurative non-union would be placed so near the external os that the normal course of a subsequent pregnancy would not be endangered by it. Adhesions between intestines and scar could not take place.

But under favourable conditions, and particularly with the os fully dilated, he considered pubiotomy a still better operation. From an experience of nine such operations, he could say it was easier in its performance than craniotomy. He was acquainted with no other operation where asepsis could be assured in so simple a manner. Patients walked on the seventeenth day, and suffered no pain or inconvenience at any time after the operation. The complications of which they had heard so much—namely, hæmorrhage and vaginal lacerations—were due to faulty technique. Though pubiotomy could not claim to be a cure

for sepsis, he would not hesitate to deliver a suspected case by it. He asked that the operation might be given a chance.

Dr. Briggs said that he felt more or less as if he were an impostor among those present, for in his whole experience he had not operated upon a suspect—if a suspect be an infected case. He was very anxious to learn the difference between local and general infections. He did not believe that bacteriology had arrived at the stage when it could give an intimation as to where a local infection would stop. Most of the infections were and remained local, but some were general. It was quite true that many cases might be saved where the organisms were local, and quite possible that those who did not operate upon suspected cases were refusing to operate upon cases which were entirely local. He did not believe that the practical localisation of the suspect infections under discussion was yet within reach, and he was inclined to adhere to his original Cæsarean section attitude, and to limit himself to clean cases. He was still a strong believer in the induction of premature labour, and he knew of many cases upon which Cæsarean section might have been performed, which had been satisfactorily treated by induction.

Dr. Edge said the question was one of avoidance of sepsis, which at first was confined to the vagina and the lower cervix; and when introduced into the uterus it was generally kept at bay for some hours by the membranes covering the uterine wall. Could not that knowledge be applied in some way to the performance of Cæsarean section? He had had three Cæsarean sections in suspect cases. The first was in the country, the membranes had ruptured twelve hours previously, and for eight hours attempts had been made at delivery. The uterus was in a state of tonic contraction. After the child was delivered, and the placenta and membranes were removed, he lightly packed the uterine cavity with iodoform gauze. In that case he thought it was due to the irrigation of the uterus and drainage that the patient recovered. In the second case attempts to deliver had been made, but he did ordinary Cæsarean section, and, although the patient suffered from black vomit, she recovered after the stomach had been washed out. In the third case the patient had been badly torn into the rectum, and there was a large fistula in the bladder. He sutured it, but a small fistula remained high up behind the symphysis. Meanwhile she became pregnant, and was very desirous of having a living child. She went to term, and Cæsarean section was performed. Five days after operation she was dead of acute peritonitis. Evidently the peritoneum was infected by the lower portion of the membranes, which were unruptured and had been soiled from the vagina.

In doubtful cases he advised ordinary Cæsarean section with certain precautions. The surgeon should eventrate the uterus and protect both the abdominal incision and the incision in the uterine wall. Except in very foul cases, he did not think it likely that the child was at fault, but that it was the lower cervical pole of membranes which carried the germs. After delivering the child he irrigated, and then separated the placenta and membranes, leaving the cervical segment to be pushed down into the vagina. The uterine incision should be as far away as possible from the cervix in septic cases.

Dr. Arnold Lea said that from Dr. Routh's figures it appeared that those cases in which the membranes had ruptured showed a mortality of from 10 to 15 per cent.; after attempts at delivery had been made the mortality was as high as 34 per cent. If the child was living the general condition of the patient must be considered in deciding on the procedure. A temperature of 100° F. or 101° F., and some quickening of the pulse, had not been regarded as contra-indicating Cæsarean section. In sixteen cases of this "suspected" type in which operation was done during labour, after rupture of the membranes, and after interference by forceps, all but one recovered. In the last seven years no case

of that type had died. The morbidity, however, was 30 per cent. These results seemed to indicate that even after rupture of the membranes for many hours, with interference, many cases escaped serious infection. Much depended on the cleanliness and care of those in charge of the patient. The most essential requirement, as could be seen from the paper, was early diagnosis of the existence of infection. The clinical signs of such infection were admittedly uncertain. The increased temperature and pulse were often merely indications of toxæmia and bacterial intoxication from saprophytic vaginal organisms, especially if the membranes had been ruptured for some hours, and there was rapid subsidence of symptoms after the Cæsarean section. Much had been hoped for from bacteriological investigation of the amniotic fluid, and he believed that the organisms could be detected in "film" preparations, either by introducing a tube into the cervix and obtaining a specimen of the amniotic fluid, or by examining the cervical secretion itself. In hospital practice a report could be obtained in half an hour. The chief organisms found in puerperal infection were streptococci, staphylococci, bacterium coli, and occasionally the gonococcus. In addition, anaerobic bacteria were often present. The hæmolytic power of streptococci was valuable, but it required twenty-four hours to give a definite answer to that test. Still, the discovery of streptococci in the amniotic fluid or the cervix in abundance would be presumptive evidence of pathogenicity.

With regard to the technique of the operation, the vagina should be thoroughly disinfected, especially before the operation; also immediately afterwards with alcohol. By care in the opening of the abdomen much could be done to avoid infection of the peritoneum with amniotic fluid, even when it appeared to be putrid. A drainage-tube was useful. In cases of obvious infection, complete abdominal hysterectomy was the only safe plan.

Dr. Herbert Spencer said that if the patient had not been in labour a long time and the membranes were ruptured, he was just as willing to operate by conservative Cæsarean section, as if she were not in labour and the membranes were intact, provided that she had been examined with due precaution. How was one to know that the cases were infected? He would pay attention to the patient's general condition, rather than to the fact that the temperature was 100° F.; that was often reached in a normal labour, with an aseptic recovery. Bacteriological investigations might be important in the future, but in the present state of knowledge he would not rely upon them. In gravely infected cases he thought Cæsarean section should not be performed. Where forceps had been applied the child's life was, in many cases, seriously compromised. It was not wrong to do craniotomy in such a case. If the uterus were torn much, he would supplement the craniotomy by vaginal hysterectomy.

With regard to symphyseotomy, pubiotomy, and extraperitoneal Cæsarean section, he did not think they should be performed in cases of septic infection. In extraperitoneal Cæsarean section it took a long time to deliver the child, and there was increased risk to its life in consequence, and the wound did not heal at all well, as shown by Döderlein's experience and advice to drain in all cases. For the cases of obstructing fibroids and for cases of cancer where labour was not advanced, he thought Cæsarean section with abdominal hysterectomy should be preferred. For advanced cases of cancer which were not operable, he recommended the old Porro's operation.

The remaining question was how to avoid infection of the peritoneum and abdominal wound, when doing Cæsarean section in suspected cases. Precautions should be taken against infecting the abdominal wound, but he did not think it was practicable or necessary to disinfect a putrid amniotic cavity. If the whole of the infected tissues were removed by total abdominal hysterectomy, it did not matter much if the healthy uterine peritoneum was temporarily soiled.

Dr. Thiele said that in examining a large number of swabs from the cervix and vagina one always met with bacteria: diphtheroid, cocci, and non-Gram-staining rods of the coliform type; there were thus present organisms which were potential sources of danger. It was difficult to recognize the organism from direct examination of the swab, and cultivation always took time. It was very rare to find organisms in such numbers and of such definite character that one could be sure of them; even in a very intense infection the number of organisms might not be large. Therefore, from the bacteriological point of view, there remained much to be desired in detecting the nature and virulence of an infection.

Dr. Lewers said that his own experience within the limits set by the title of the paper comprised two cases. The first had been examined several times, and as there was no progress after many hours, the forceps was applied without success. As the child was alive, and as it was impossible to deliver with the forceps, a conservative Cæsarean section was done, and the patient made an uninterrupted recovery. The second patient was a dwarf, and had a pelvis with a true conjugate of about 2⅝ inches. She had been three days in labour, and had been examined by several practitioners. On admission the temperature was subnormal, the pulse 140; she was having very strong pains, and her condition was certainly serious. But the child was alive, the fœtal heart being quite strong. Cæsarean section was performed, and ultimately the recovery was good. The existence of infection was proved by the formation of an abscess, which opened spontaneously in the lower angle of the abdominal wound, and also into the vagina. He was unwilling to wash out the uterus before the operation. He doubted whether, with the fœtus in it, one could wash out sufficiently to get rid of everything which should be removed; and there was danger in doing anything which could be avoided if Cæsarean section was to be done afterwards.

Dr. Ernest Shaw said his experience had been principally general hospital work and private work on cases after childbirth. Infection of the uterus at childbirth might be due to one of a variety of organisms, but he believed the commonest was the streptococcus, both the long-chained and the short-chained forms. The next commonest, and the only one he had found in addition, was the Staphylococcus albus. He was surprised to find it in several cases of what was termed puerperal fever. He attached more importance to that organism than most observers did, because he had found it in infective endocarditis, in abscesses, and in a case of definite septicæmia. Recently he had carried out a routine examination of swabs and smears from the cervix and uterus in cases of infection after childbirth. The cases which he had been able to demonstrate to his own satisfaction as septicæmia had been those in which streptococci were present in the blood. He suggested that as the streptococcus was the most common organism found, each case should be treated as one of streptococcal infection until the contrary was proved. He believed that the injection of polyvalent antistreptococcic serum did good in such cases.

Dr. W. J. Gow said the point on which he desired to comment was as to what should be done in cases where it was known or suspected that the amniotic fluid was infected with pathogenic micro-organisms. If a patient was infected with streptococci during delivery, she ran risks of dying of puerperal fever, whether she were delivered by Cæsarean section of by any other method. But there were cases in which the patient was free from infection constitutionally, and yet the liquor amnii contained pathogenic organisms which, when ordinary Cæsarean section was done, would inevitably escape into the peritoneal cavity. Forty of his own cases of Cæsarean section were not in labour, or were only in the first stage of labour, and the membranes were either unruptured, or only just ruptured. There were no deaths. But in eight cases the membranes had been ruptured for some time, and of these one died. In this case the membranes

had been ruptured forty-eight hours, and several attempts had been made to deliver with forceps. She died on the fifth day, and a staphylococcus was cultivated from the peritoneal effusion. The important questions raised by Dr. Routh could only be answered conjecturally in the present state of knowledge, because only lately had the importance of infection of the liquor amnii been appreciated. It would be agreed that suspicion of infection was justified when the membranes had been long ruptured, and there had been several attempts at instrumental delivery. There were many organisms in the vagina which, when introduced into the liquor amnii, rapidly multiplied, and were very undesirable inhabitants of the peritoneum. Some cases could best be dealt with by craniotomy, especially where the child's life had either been already lost, or was seriously embarrassed by numerous attempts at forceps delivery. The other alternatives were abdominal hysterectomy or conservative Cæsarean section, special efforts being made in the latter case to avoid peritoneal infection. He thought that Cæsarean section would give good results in the future if the following precautions were taken :—If attempts had been made some hours before to deliver by forceps, it would be well, where practicable to irrigate the uterine cavity, then to eviscerate the uterus, protecting the edges of the uterine wound with a sterile towel or sterile gauze, and taking care that none of the liquor amnii escaped into the peritoneal cavity. Frequently the changes in the liquor amnii were manifested by a highly putrefactive odour. It was the peritonitis which killed the patient, and the peritonitis was set up by the infected liquor amnii gaining admission into the abdominal cavity.

Dr. Maxwell said he could not claim to have a great experience of Cæsarean section, since he had done only four cases, but he had been fortunate enough to have had opportunities of studying the methods and technique of many of the senior members who had taken part in this debate. That experience had certainly impressed him with the necessity of exercising the greatest care in investigating these cases from the point of view of prior sepsis.

Many members present had probably seen Cæsarean section performed in cases where there was reason to fear previous exposure to infection. Some of these patients had recovered, but before accepting these cases as evidence that all precautions were unnecessary one would have to investigate the puerperal morbidity most carefully. Some caused the very greatest anxiety owing to severe ileus; in others the abdominal wound suppurated; or localised abscesses pointed and burst by the abdominal wound or per vaginam. Now, the border line between the cases that eventually recovered after grave morbidity and those that died of a rapid peritonitis in two or three days was such a very narrow one that he (the speaker) held that all serious puerperal morbidity should be frankly accepted as evidence that embryotomy or some modification of technique should have been carried out rather than the classical Cæsarean section. One of his cases, a rachitic dwarf, primipara, could be reasonably regarded as of the "suspect" group. Inquiry as to the nature of the manipulations and the care with which they had been performed made him feel that, in the presence of a live child and the absence of clinical signs of infection, some modification of Cæsarean technique rather than embryotomy was indicated. The method adopted consisted in antepartum irrigation of the uterine cavity with normal saline solution, associated with incision of the eventrated uterus.

He thought that in any case where forceps had been applied the amniotic cavity rarely escaped infection. But a distinction must be made between infection of the amniotic contents and infection of the patient. His object was to get rid of the infected liquor amnii, or at least to dilute its toxicity. The technique was perfectly easy in his case; a soft pewter douche tube was passed up to the fundus beyond the fœtal head, and normal saline fluid, temperature 105° F., was

allowed to flow for five minutes. The uterus was then eventrated, and incised at the fundus after most carefully packing off the peritoneal cavity. After closure of the uterus, towels and rubber gloves were changed and the abdomen sewn up with fresh instruments. This method obviously had its limitations. For instance, when the fœtal head was firmly impacted in the brim, an attempt to displace it would have been unjustifiable in the presence of tonic action of the uterus.

The bacteriological aspect of the paper was one of its most interesting features, and all who read it must have been struck with the consistently accurate forecasts of the infective organism made from simple "smears." He had made six similar observations on material removed from the uterus in cases of puerperal infection. In two cases the culture proved sterile; in the remaining four the cultures grew either streptococci or bacillus coli, while the examinations of the smears had been negative. If streptococci had been seen on a "smear" they would not be proof of infection, since they might not necessarily be pathogenic germs. But he thought it was quite reasonable to expect that bacteriologists might soon discover some differential methods of staining that would clearly and rapidly distinguish between a pathogenic and non-pathogenic organism.

Mrs. Scharlieb said all would admit that there was great difficulty in knowing which cases were infected or suspected of infection, and which were not. One of her cases was distinctly unfavourable. She had a generally contracted and much flattened pelvis, with a conjugate of 2½ in., she had been long in labour, Bandl's ring was present, the membranes had been ruptured twenty-four hours, her pulse was 108, and there was constant vomiting. The child, although presenting by the head, passed meconium, and yet the patient recovered after ordinary Cæsarean section without any drawback. She thought it was the duty of those who undertook such cases to have a bacteriological examination made of the liquor amnii and of any discharge which might be present, not only with the view of guiding the treatment at the moment, but also in order to furnish a vaccine, which might prove of inestimable value in the subsequent treatment.

Dr. Maxwell's suggestion of intra-amniotic irrigation seemed a very good one, but where there had been repeated examinations, not only was the amnial cavity infected, but in many instances the cervix and the lower portion of the uterus were damaged. No disinfection of the amnial cavity, and no ordinary Cæsarean section, would then avail to save the patient from infection. In such a case she thought the wisest plan was to perform abdominal panhysterectomy, leaving a sufficient opening in the vaginal vault through which drainage could be carried out. She could not believe that in any infected case either extraperitoneal hysterectomy, or symphyseotomy, or any variety of pubiotomy, was advisable. No doubt all detested the idea of doing craniotomy on a living child; still, sometimes it was a regrettable necessity, especially where everything was unfavourable to operation, and it gave the chance of saving the woman's life; there was no reason in sacrificing two lives when one sufficed.

Teaching should be so directed that the younger members of the profession should be encouraged to do abdominal work, so that they would not be taken at a disadvantage in a critical case, and could give the patient the benefit of panhysterectomy or a conservative Cæsarean section, as might be indicated in cases with narrow pelves, so narrow that there was no hope of delivery per vias naturales. She thought it a pity not to say a word in favour of the old-fashioned English treatment of inducing premature labour. In her early days in India, when she had no skilled chloroformist or assistant, she would have failed to save many lives of mothers and infants if she had not been able to bring about induction. She had never found it dangerous to the mother, nor had she seen a woman even ill in consequence of it. A considerable percentage of children lived after it, especially if it were possible to postpone the operation

until the child was not only technically viable, but sufficiently developed to have a really good chance of life.

Sir Francis Champneys said he only intended to refer to one point in the paper—"the inevitable abrasions of the cervix during the operation" (of craniotomy). Now craniotomy consisted in perforation of the fœtal head, and he did not see why this should inflict any "inevitable abrasions." Dr. Routh probably included in the term "craniotomy" the further operation of extraction, but the two were separate operations, and extraction need not always follow perforation. The first perforation for contracted pelvis which he ever saw was left to Nature, and expulsion followed without difficulty. He believed that the danger of "craniotomy" was essentially the danger of extraction, and this might be considerable. In any future statistics of craniotomy he thought that cases should be divided into two classes—those in which extraction did not, and those in which it did follow perforation. It was obvious that natural expulsion was not likely to occur when the conjugate was less than a certain size—say 3 in., or at least 2¾ in.—the labour being at full time, and the child of average size. The perforation of a living child was a most painful and unpleasant operation, but it ought to be less repugnant than allowing the mother of a family to die for want of it.

Dr. A. J. Wallace had recently operated on two cases of probable infection, and he wished to bring before the Section the method which had been adopted. The patient was a primipara, æt. 22, who had been three days in labour. Many attempts had been made at delivery, and her pulse on arrival was 140. The conjugate was only 2½ in. As the child was alive, he advised Cæsarean section. The method he adopted was to sew parietal peritoneum to the walls of the uterus by a suture which was duplicated, two rows of overlapping sutures all round, the resultant opening being 6 in. in length and 3 in. wide. A vertical incision was made into the uterus, and, after the extraction of a living child, a drainage-tube was placed through the abdominal wall, down to the uterus. From the first there was a foul purulent discharge through the drainage-tube; the patient's pulse was rapid, and on the third day the wound showed signs of opening up. When opened up it was found that universal sloughing was going on. In course of time a slough came away from the uterus. The patient ultimately recovered, and the utero-parietal fistula closed up. The second case was dealt with in a similar way. The patient came after labour had been in progress thirty-six hours, and forceps had been repeatedly used. A purulent discharge occurred from the two drainage-tubes used. The uterine wall did not slough. He inoculated the wound with the lactic acid bacillus, which he thought was of use in such cases, and two days afterwards all the offensive purulent discharge had ceased. He considered that in the first case certainly, and perhaps in the second also, life had been saved by the preliminary use of the utero-parietal suture.

Dr. W. G. A. Griffith pointed out that, while it was obviously their duty to investigate these "suspect" cases in the most accurate and scientific manner possible, it would still, in the emergencies of practice, be necessary for the great body of practitioners to depend on their experience and powers of observation, rather than on the scientific methods of bacteriology, for the determination of the best mode of treatment. He had only had one bad septic case requiring Cæsarean section; it was complicated with fibroids, and hysterectomy was performed after delivering the child. This was the only fatal case in his series.

Dr. A. W. Russell thought it was not always the cases presumed to have been exposed to infection that went wrong. He had now had thirty-three cases of Cæsarean section—intraperitoneal and extraperitoneal—with no maternal death. Twenty-nine of these appeared in Dr. Routh's list. In three of them he attempted extraperitoneal section, and in one since that list was completed. His

cases were probably unique in regard to the frequency of contracted pelvis as an indication for the operation. It had been the only indication for operation, except in one case, in which it was a last resort owing to repeated eclamptic attacks.

In regarding cases as "suspect," he had not considered the previous history, or attempts with forceps, so much as the state of the mother at the time, and the vitality of the child. He laid great stress on the disinfection of the vagina by copious douching, and scrubbing of the parts, which he personally supervised. The disinfection of the surgeon and his assistants was also important; they wore rubber gloves, armlets, and masks. He had never eventrated the uterus before incising it, but carefully packed it round with large swabs. When the child was removed, the placenta and membranes were peeled off, and the interior of the uterus was thoroughly cleansed—a procedure he considered very important. He even used the scalpel to scrape the surface of the uterus where there seemed to be softened membrane, with possible infection. With regard to morbidity during the recovery of the patient, he did not hesitate to wash out the uterus if it seemed necessary. For sewing up the uterine wound he used catgut, usually chromicised, and put a continuous suture of the peritoneum over the top of the interrupted sutures.

He had done the operation of extraperitoneal Cæsarean section several times, and wished to refer to its scope in the kind of cases under discussion. It was now admitted that it was not freely available for actually septic cases, as was expected by its original promoters. There was a class of cases, however, in which the classical intraperitoneal operation would seldom be considered—viz., the cases that were advanced in labour with the presenting part bulging forwards above the symphysis and the lower uterine segment stretched. In his cases he followed the method of Sellheim and Döderlein, using Pfannenstiel's transverse incision, distending the bladder with sterile fluid, and using blunt dissection through the cellular tissue of the cervix. In undoubted cases of infection that were otherwise favourable he would certainly say there was a place for extraperitoneal Cæsarean section with drainage into the vagina or through the wound. It was practically as easy an operation as the intraperitoneal method, and with no more likelihood of hæmorrhage. He would prefer to describe it as complementary to the usual intraperitoneal operation, and specially available in cases of advanced labour, even where the patient on this account had been exposed to infection.

Dr. Leathem said that a fairly reliable report from the examination of films could be given as to the presence of certain pyogenetic cocci, provided they were present in considerable numbers. The question as to the identity of bacilli was more difficult. The number of swabbings he had examined was far too small to enable conclusions to be drawn as to whether or not infection of the amniotic cavity could be detected by this method.

Professor Bumm appeared to make use of this means of examination and he presumed it worked satisfactorily.

On the question of distinguishing between the pathogenicity or non-pathogenicity of organisms seen in films he was not prepared to say anything. If staphylococci or streptococci were seen in films he would assume that they were pathogenic, not saprophytic. He did not feel at all hopeful that for some time to come it would be possible to distinguish between pathogenic and non-pathogenic streptococci by any means of differential staining.

Dr. C. Hubert Roberts sad that he found great difficulty in defining a "suspect" case. Many cases must be "suspect," but they could not say to what degree, and yet conservative Cæsarean section proved successful.

At Queen Charlotte's Hospital from time to time they got the most serious cases of obstructed labour, cases in which every possible attempt at delivery had

already been made outside, and where, clinically at all events, infection seemed very evident. In such cases the child was dead or dying, and craniotomy or embryotomy was performed, yet such women often went through a normal or almost normal puerperium. He contended that if Cæsarean section were done on such cases it would have added a grave risk to the mother and would not have saved the child.

Dr. Eden remarked that most of the speakers took the view that the danger in the operation was that the peritoneal cavity might be infected by the liquor amnii. He agreed that that was a factor, but he did not think it the principal one. The chief risk was in the infected condition of the uterus itself. In most cases he supposed it was an ascending infection beginning in the vagnia or in the cervix. The lower uterine segment had been stripped of its membrane, and if infection reached the vaginal mucous membrane or the cervical canal, it must spread by continuity to the tissues of the lower uterine segment. Infection of the peritoneum by liquor amnii could be prevented by careful technique. If from extreme pelvic contraction in a septic case, craniotomy was impracticable, and Cæsarean section had to be done, the only safe plan was to remove the uterus. The danger of extraperitoneal Cæsarean section was that an infected uterus was left. In two cases in which he had performed craniotomy on the living child, the liquor amnii was offensive, and the patient had a temperature of over 100° F. When both conditions were present one should conclude there was definite infection of the uterus. Among the suspected cases he would include those in which a long period had elapsed since the liquor amnii had drained away, or in which repeated attempts at delivery had been made, or where the surroundings made asepsis difficult to carry out. When there was no reasonable doubt of the presence of infection, the uterus should be removed ,and personally he preferred the supra-vaginal operation, providing for free drainage, both suprapubic and vaginal.

Dr. Sam Cameron thought that very frequently it was impossible to state whether a case was infected or not. Even if a case were infected there was no reason why Cæsarean section should not be performed. The presence of a foul-smelling discharge might indicate infection by putrefactive bacteria which did not seriously endanger life. He would not even attach any great importance to the presence of streptococci in the amniotic fluid, and it was impossible to prophesy the virulency of the organism, as the same organism might affect different patients in very different ways. Therefore he would not allow the presence of streptococci to influence his operative procedure. He had been guided almost entirely by the general condition of the patient. When a case, however, had been repeatedly examined before her admission to hospital he removed the uterus by supravaginal hysterectomy. So long as a woman was not moribund and the child was still alive, he performed Cæsarean section, but never craniotomy.

He did not feel inclined to perform extraperitoneal cæsarean section, because it took a longer time to perform, and the surrounding cellular tissue was liable to get bruised during the various manipulations.

The President (Dr. Macnaughton-Jones) said that it would be difficult in a few words to convey to Dr. Routh the appreciation of the Fellows, not only those who had taken part in the debate, but also of those who had not joined in it. He (the President) was both pleased and proud to be the medium of conveying to him the warm admiration of the Section for his most exhaustive and valuable communication as reporter on this subject at the International Gynæcological Congress at St. Petersburg, as seen by his paper in the current *Journal of Obstetrics and Gynæcology*, he had most worthily represented this Section.

The main question on which this discussion hinges were, to his mind, sepsis—a living or dead child—uselessness or inadvisability of trying recognised obstetrical

methods—the child's life as against the mother's. He had barely time to say a few words embracing these four points.

He disliked the term "suspect," introduced into obstetrics, he presumed, from criminals so classed. The mere fact of examinations having been made, or an attempt at delivery having failed, did not in the vast majority of cases, unless reckless or wholly unwarrantable practice had been pursued, justify the conclusion that a woman was threatened either with sapræmia or septicæmia. If such a practice had been pursued, she was in all probability no longer a "suspect," but an actual septic victim to wrong treatment. The various opinions expressed by the bacteriologists who had spoken only showed that they were not yet on sufficiently firm ground to rely on bacteriological examination to determine this. He would not himself be influenced by a hurried microscopical report without culture as to the course he ought to pursue, whether that report were positive or negative. Assuming that a skilled bacteriologist—and the opinion of none else would be of any value—assured him that he found pathogenic germs in the microscopical field, he would be influenced far more by the clinical signs and symptoms present, though such a report would be confirmatory of his decision as to the course he should pursue. Sir Almroth Wright cautiously used the expression "might be possible to detect," in his reply to Dr. Amand Routh as to the value to be placed on miscroscopical examination, and the latter himself said, "With our imperfect knowledge in the presence of both virulent and putrefactive organisms one would have to treat the case from the point of view of the most virulent germs."

Were they not rather inclined to make too great a bogey of this "suspect" sepsis in the face of their modern aseptic and antiseptic possibilities? He said this, regarding it both from the point of treatment and operation, no matter what method of delivery was adopted. Dr .Maxwell's plan of attempting to sterilize the amniotic fluid was valuable, and, in view of operation, was an important advance. We might here suggest that one of the most valuable bactericides was cyllin. It was quite innocuous in the proportion of one in four hundred, which, in warm solution, was destructive to the Baccilus coli, Staphylococcus aureus, and the streptococcus. This would indicate its free use both locally to the parts, in the vagina, and its injection by Dr. Maxwell's method.

As to the all-important point, accepting the presence of a local sapræmia, or a commencing systematic sepsis, and that the case was then seen for the first time, at any stage of a labour in which delivery by any other than operative methods was impossible, they were at once brought face to face with the remaining question, Was the child living or dead, and was the performance of Cæsarean section, or one of its alternatives, the right course to pursue? He presumed that they were all fairly agreed that if the child was dead, whether under "suspected" or recognisable septic conditions, cephalotripsy or craniotomy was the correct one. Then arose the question of a living child. Personally, in view of modern asepsis and improved technique, he would favour in those cases in which the nature and degree of the septic invasion did not contraindicate it, the patient being surrounded by the precautions of a hospital technique—Cæsarean section. The choice of the particular method must lie with the individual operator and his experience of its results. In cases where the only alternative was hysterectomy, and a choice had to be made between the supravaginal operation and panhysterectomy, cæteris paribus, he would prefer panhysterectomy, though here again the decision must depend on the local condition.

As regards consideration for the child's life as against that of the mother, when forced to make a choice he would unhesitatingly move in the direction of the mother's safety rather than that of the child. The wishes of the woman, however, must not altogether be ignored; her anxiety for maternity, on the one hand, her distinct disinclination for operation on the other. During nineteen years

of public midwifery work, both in the Poor-law service, and ten years on the staff of the Cork Maternity Hospital, he had lost but one mother with the child from contracted pelvis, and here the fatal issue was unavoidable from previous prolonged interferences on behalf of an ignorant midwife. He was absolutely certain that he had not performed cephalotripsy or craniotomy more than twice on a living child, and once he had to perform embryotomy in the case of a small dwarf. The mother recovered.

Tempora mutantur nos et mutamur in illis. It was possible that he would now remove those cases to hospital and perform Cæsarean section.

Dr. Routh remarked in his paper how doubtful, or even hopeless, and also how divergent, many of the opinions were that were expressed at the International Congress with reference to Cæsarean section or its alternatives. Professor Bumm specified four conditions under which craniotomy was indicated—viz :—

(1) "That in the primipara, when infection is undoubtedly present, craniotomy is the best and the surest treatment, for by it one life already compromised is lost; whereas, by all other methods, two lives would probably be sacrificed."

(2) "If the amnion has been ruptured for some time and there is even only a slight elevation of temperature, classic Cæsarean section is fatal."

(3) "In all cases of bacteria of any kind we object to the section, and make the perforation of the child."

(4) "When bacteria are found in fever cases, we perforate the child."

Pestalozza, in definitely infected cases, decides that embryotomy should be performed.

Sellheim, in similar cases, advises embryotomy.

Munro Kerr, who, he regretted, was not able to be present that night, has stated: "In recent years I have made it a rule never to perform Cæsarean section in cases which have been interfered with prior to their coming under my care unless the pelvic deformity is so extreme as to render craniotomy impossible or more dangerous to the mother. I am compelled, therefore, not infrequently to perforate a living child."

Dr. Routh himself said: "Extraperitoneal Cæsarean Section and all forms of pelviotomy are better avoided for septic cases, and as classical Cæsarean section has a death-rate of from 10·8 to 34·3 per cent., there remains, therefore, only craniotomy or some variety of Cæsarean hysterectomy." Also in two other types of case he advised craniotomy.

Jardine, Whitridge Williams, and Singer were quoted as regarding craniotomy as the operation of election in the presence of sepsis when it could be performed. In the face of such opinions he did not think that anyone was justified in applying the term "criminal" in connection with craniotomy, nor could one yet regard it, as described by the distinguished Master of the Rotunda in this debate, as one of the "obsolete barbarities of the past." Such an extreme position was, he maintained, not justifiable, and he did not consider it would be right to allow it to pass unchallenged by the Section.

Dr. Amand Routh, in reply, after thanking his hearers for the kind reception of his paper, spoke of the great difficulty in clinically deciding whether one of these "suspect cases" was infected. He had strong hopes that a bacteriological examination of the liquor amnii would be sufficiently reliable to decide the point.

He thought that Cæsarean section preceded by intra-amniotic irrigation and eventration of the uterus with careful protective packing round the uterine neck and a fundal uterine incision, would suffice to protect the patient if the liquor amnii was alone infected. If, however, the uterus itself was infected, nothing but a hysterectomy would suffice. As to whether a panhysterectomy, which removed a possibly infected cervix, was better than a subtotal hysterectomy, further experience was needed.

It was satisfactory to find that no one advised extraperitoneal Cæsarean section or pubiotomy for definitely septic cases, and only very few would thus operate in "suspect cases."

Craniotomy, though greatly disliked by all, was still occasionally required. He hoped intra-amniotic irrigation would be another step towards saving "suspect cases" from craniotomy, for it would enable Cæsarean section, properly safeguarded, to be adopted.

Yet craniotomy could not be entirely dispensed with, especially in general practice where prompt bacteriological assistance and skilled technique in abdominal surgery might not be available.

In spite of the fact that bacteriology was not yet an efficient guide as to the presence and significance of the infective germs, he had great hopes that in the future such help would be forthcoming, and that further improvement in differential staining and other methods would enable the obstetrician to know within an hour of the patient's admission the extent of her infection, and guide him as to the operation he should perform, and possibly also assist him by in some way strengthening the resistance of the patient. He hoped obstetricians would help by having the liquor amnii examined bacteriologically in all "suspect cases," and at the same time make a note of the operation performed and its results in every case. In time the evidence thus collected would enable the treatment of these cases to be put on a real scientific basis.

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY.

Meeting held at Sheffield, March 17 1911, Dr. J. B. Hellier (*President*) *in the Chair.*

The President showed a fœtus with webbed extremities and complete absence of the kidneys, ureters and bladder. It had apparently developed normally otherwise to about the eight month of fœtal life.

Dr. Lloyd Roberts (Manchester) showed a specimen of cystic tumour of the breast, which he had removed. The origin of these tumours was discussed.

Mr. Cuff (Sheffield) showed specimens of fibromyomata; also a hair-pin removed from the bladder by vaginal cystotomy.

Dr. Gemmell (Liverpool) showed a specimen of teratoma of the ovary with drawings, x-ray photograph, and microscopic sections.

The specimen consisted of the ovary, tube and part of a cyst-containing broad ligament on the right side; the ovary definitely separate from every other structure; in external appearance, simulated a small fœtus with head, back and limbs; on dissection the portion resembling the head, was an oval, egg-shaped body, calcified all over, and at its broader end showed indications of occipital and parietal sutures. This closed cavity when opened contained a yellowish material, of the consistency of gruel, which on chemical examination proved to contain cholestrol and a substance resembling "protagon" or some similar brain lipoid, which contained sugar and was considered to be of nervous origin and nature.

Other portions of the ovary contained thyroid gland tissue of an adenomatous type, and calcareous nodules and masses but without any definite arrangement resembling fœtal limbs.

The specimen was considered to be a compound ovarian teratoma, with an attempt at the formation of a skull cavity with brain in that cavity and with thyroid formation and deposits of lime.

Dr. Walls (Manchester) reported two cases of ectopic gestation accompanied by inflammation of the tube of the opposite side. In both cases it was necessary to perform double salpingo-oophorectomy.

Mr. Miles H. Phillips (Sheffield) reported a case of Chorionepithelioma of the Fallopian tube. In September 1908 the patient, a iii-para of 28 years, had the left tube removed for what appeared to be a tubal gestation. Its inner end was enlarged to form a cylindrical mass measuring $3\frac{1}{2}\times1\frac{1}{2}\times1\frac{1}{2}$ ins. On section it appeared to consist of organizing blood clots; there was no trace of an ovum. Microscopical examination of peripheral portions of the tumour showed typical chorionepitheliomatous tissue deeply invading the wall of the tube. The uterus was then explored with a negative result. Six weeks later a recurrent mass could be felt in the left broad ligament, and an ovoid swelling of purplish colour had appeared in the anterior vaginal wall. The patient had become thinner and paler. Total hysterectomy, with removal of the apparently healthy right appendages and left ovary, was then (November, 1908) performed. At the same time a nodule ($1\times1\times\frac{3}{4}$ ins.) was excised from the upper wall of the bladder and another ($1\times1\times\frac{1}{2}$) from the anterior vaginal wall. No attempt was made to remove a nodular mass situated at the root of the mesentery. The recurrent growth and the two metastatic nodules consisted largely of blood clot, but all showed typical chorionepithelioma. The patient made a rapid recovery from the operation and steadily gained in weight and strength. At one time there was a cough with blood stained sputum, but no physical signs of growth in the lungs was detected. Ten months later the mesenteric swelling had quite disappeared, and in March, 1911 (two years and four months after the radical operation), there were no signs of recurrence in the pelvis or elsewhere.

ROYAL ACADEMY OF MEDICINE IN IRELAND.

SECTION OF OBSTETRICS.

Meeting held Friday, March 24 1911, Dr. H. Jellett (*President*) *in the Chair.*

Malignant Ovaries.

Dr. Tweedy showed malignant ovaries which developed in an elderly unmarried woman. Her symptoms were those of hysteria. She was seen by several doctors, who noticed a lump in the abdomen which was considered to be a myoma. Operation was considered advisable. When he (the speaker) examined the case he found the woman suffering from constipation, weakness, and loss of flesh. The tumour was very palpable, hard, and nodular, precisely like a myoma, but taking into consideration that it was doing the patient harm, and had only been noticed within the last six months, he had no hesitation in calling it a malignant tumour. When he opened the abdomen he found two tumours growing, one on either side of the uterus; the latter was small and adherent. The tumours had all the appearance of primary carcinoma. One tumour was lying almost detached, and was fixed in Douglas's cul-de-sac in close communication with the ovary. It seemed to have been detached from the ovarian tumour, and had made extensive adhesions to the rectum. He removed it in its entirety, together with two inches of the upper portion of the rectum. He then started to stitch up this rectal incision, and having closed it, he found she had scybalous masses in the bowel. His house surgeon, in removing these masses, had gone through the rectum. This accident

he (the speaker) believes is much commoner than supposed. His house surgeon did not think he was using any force. The bowel was stitched up one and a half inches from the anus, and iodoform gauze packed around the infected area. He put in a tube to encourage discharge, which came away copiously for two or three days. She did uncommonly well, and he did not like to remove the plug, but kept it in for seven days, and fed her on albumen water, one and a half pints daily, and at the end of five days added half a pint of whey. On the day after taking out the plug a fæcal fistula formed. The bowels were then opened. The fæcal fistula has now nearly dried up, and her temperature and pulse are normal.

Sir Wm. Smyly said some years ago he was called in consultation to a woman upon whom a doctor had tried to separate adhesions by Schultz's method. Two fingers went through the rectum, and the woman died of peritonitis. At that time gloves were not in vogue. He (the speaker) thought gloved fingers were much more unlikely to go through the bowel. In a tubercular rectum the fingers will go through with great ease. He operated on a case of tubercular tubes. On passing his fingers into Douglas's pouch to separate adhesions he found he had gone through the rectum unconsciously. He stitched up the wound, and four weeks later fæces came away through the abdominal wound.

Dr. Crofton said the tumour was of a very malignant nature, the cells were in a tremendously active state of division, and heteromitoses were very well marked.

The President asked why the gauze had been left in for seven days.

Dr. Tweedy said if the gauze is taken out within twenty-four hours or forty-eight hours great difficulty will be found in its removal. After four or five days it is an easy matter to pull it out. Theoretically, adhesions are supposed to form around the gauze in forty-eight hours, but this is only partially true, and in many cases adhesions only form around the gauze at the end of three days or longer.

A Case of Natural Delivery after Cæsarean Section.

Dr. Solomons read "A Note on a Case of Natural Delivery following Cæsarean Section," in which he commented on the dread which beset most obstetricians of allowing a woman with a cicatrix in her uterus to deliver herself. The baby born by Cæsarean section weighed 7lbs., the one born naturally 6½lbs. The true conjugate after measuring at the birth of the first two babies was 7 c.m. Transverse diameter of inlet 10 cm.; at the birth of the third the conjugata vera was 8 c.m., transverse 12·5 c.m. Myomectomy was cited as an instance of the safety of allowing a woman with a uterine cicatrix to deliver herself. Sterilisation of the patient should never be performed.

Dr. Holmes said there must have been some disparity in the measurements considering there seemed to have been an increase of 1 cm. in the conjugata vera and 2 cms. in the transverse diameter. With regard to the weight of the children, the child born by Cæsarean section weighed 7 lbs., whilst the other weighed 6½ lbs. He thought the size of the child's head must be taken into consideration.

Dr. Tweedy said he did not think the pelvis had enlarged between the two births. The pelvis must have been wrongly measured the first time, as it is easy for those without much practice to go wrong in the use of Skutch's pelvimeter. He considered it an extremely rash thing to have allowed the woman to deliver

herself considering that the uterus was adherent to the scar, and the woman gave a history of a sinus for three years after the Cæsarean section.

Dr. Gibbon FitzGibbon asked, considering the child was 6½ lbs., was there any indication of its being premature. The fact of this woman having delivered herself naturally was not a point against sterilisation, and he thought that when a woman had to undergo a second Cæsarean section the question of sterilization should be decided by the wishes of the patient, particularly when the children were living.

The President said he did not see why the uterus should rupture during labour if it was adherent to the back of the abdominal scar. An attempt was made to encourage the formation of such adhesions with the object of protecting against a possible peritoneal infection, and a considerable number of patients must have come into labour, because after all the practice of performing Cæsarean section before the patient had been some time in labour was one of quite modern growth. This practice is considered to be very good. If the uterine scar ruptures during labour, it would be immediately diagnosed, and would not be a serious matter. In regard to sterilisation, one must take into consideration the number of children the patient had. He would be inclined to carry out her wishes if she had had children before. It is a recognized treatment to perform division of the tubes in cases in which the patient has had recurrent renal disease during pregnancy, and where there is a possibility of her having it again during the next pregnancy.

Dr. Solomons did not think the pelvis was wrongly measured considering that the measurements carried out in the Rotunda and Holles Street were found to correspond. The woman had been before the Academy of Medicine before, and no mention was made about a sinus or suppuration, and he did not attach much importance to her statement. As regards the maturity of the child, both its appearance and the history showed that she was up to her full term. He did not see why a uterine scar should prevent a patient continuing her labour. As regards sterilisation of the patient, he quoted Karl Hartmann's statistics, which showed that there was less danger in performing subsequent Cæsarean sections than in doing it the first time. This seemed to be a strong argument against sterilising the patient.

Notes on Two Cases of Clinical Interest.

Dr. Jellett read notes of two cases of interest.

The first case was one of perforative appendicitis complicating pregnancy and labour. The second was one of eclampsia in which death occurred from rupture of an abdominal vein.

Dr. Tweedy said that he was quite aware that certain people got apoplectic seizures even if they had not got fits. Hæmorrhages into the brain are common in epileptic attacks. When he stated on a previous occasion that no woman should die in eclamptic fits he meant that a woman should not die of the fit itself. He said if septic microorganisms were found in the liquor amnii before labour, the woman should be delivered by Cæsarean section and the uterus removed. This case went to prove that this treatment was the correct one. He thought the presence of microorganisms in the uterus was a clear indication of adhesions with the intestine or some suppurating focus in the abdominal cavity.

Dr. Crofton said if the vaccine was mixed with 10 to 20 cc. of antistreptococcus serum the streptococci are more or less sensitized, more easily taken up, and produce more antisubstances with much less risk to the patient. The "antigenic" effect of the vaccine is not affected, and the mixture produces active as well as

passive immunity. He thought before doing the operation of total extirpation of the uterus one should first try specific therapy.

Dr. Rowlette said he did not think the vaccine had anything to do with the patient's death, as the dose given was very small. He doubted whether the putrefactive organisms were the most important, for saprophytic organisms were also found. Her abdomen was full of putrefactive fluid. He had not tried mixing the vaccine with the antiserum, but he had given them side by side with no better result, but with an attack of neuritis in one case which was not serious. He did not consider that any vaccine treatment would have been of use in this case. With regard to the eclamptic case, although there were the typical changes of eclampsia, it was impossible to find where the hæmorrhage came from, but it seemed to be from a branch of the inferior mesenteric vein.

Sir Wm. Smyly said that the second case had died from perforation of the appendix, and the only chance of saving her life would have been to have opened the abdomen and to have removed the appendix. An exact diagnosis could not have been made.

The President considered it too wide a statement that if bacteria are found in the liquor amnii a hysterectomy should be done. There was one point in this case in favour of this, for if this had been done one would have seen the perforated appendix. It was an analogy of sarcoma of the uterus in which there is pus inside, or myoma of the uterine cavity with an acute infection. He thought if one removed the myoma or the pus he would endeavour to treat the local uterine condition, and if this condition is a local one and there is no evidence of its spreading to the peritoneal cavity, he thought that the treatment in the first instance would be the local treatment of the infected uterine cavity from the vagina. The reason he said the epithelium of the chorionic layer protected the child was because there was no obvious evidence of fœtal infection, and the epithelial layers of the chorion were found intact only at the placental site.

GLASGOW OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY.

Meeting held March 29 1911, Dr. A. W. Russell (*President*) *in the Chair.*

Dr. Dickie showed, (1) Tuberculosis of Uterus, Ovaries and Tubes; (2) Adenocarcinoma in a Fibroid Uterus.

Dr. Duff showed Fibroid Uterus. Patient had an extrauterine pregnancy removed eight years before hysterectomy.

Dr. McIlroy showed for Dr. Cameron: microscopic sections of a secondary growth in the Fallopian Tubes in a case of Papillary Cysts of the Ovaries.

Dr. A. W. Russell read a paper on the discussion on Cæsarean Section at the Obstetrical Section of the Royal Society of Medicine Meeting in February.

Dr. J. M. Munro-Kerr read a paper on the

Operative Technique in Cæsarean Section.

He said the real questions of importance as regards Cæsarean section were: (1) The dealing with infected or suspected cases; (2) The suturing of the uterine wound; (3) The position of the uterine incision.

Attention was drawn to the great mortality in cases that had been handled

before the operation was performed, and he was of the opinion that conservative Cæsarean section in such cases was not justifiable. The difficulty was to find a substitute. He suggested craniotomy, Cæsarean panhysterectomy and the extraperitoneal variety of Cæsarean section. He was inclined to favour craniotomy as he had a great dislike to remove the uterus from a young healthy woman who would possibly become pregnant again. Even when one performed Cæsarean section in such cases one found the fœtal mortality high. When Cæsarean section was performed in a "suspect" case, he advocated the complete removal of the uterus as the cervix—the infected area—was removed. He would not hesitate to perform a Cæsarean panhysterectomy in a woman coming near the menopause who, in consequence, would not have another chance of becoming pregnant.

Dr. Kerr described the extraperitoneal operation as performed by Döderlein, but he did not think in suspect cases, even when accompanied by Sellheim's fistula for drainage, that it gave any better results than the other procedures. In order to reduce the possibility of sepsis as much as possible, he suggested the removal of the placenta *per vias naturales*, and not through the uterine wound as formerly. He mentioned the douching of the uterine cavity with saline as advocated by Maxwell.

The uterine wound, he said, was peculiar and unlike the wound in any other abdominal viscus in that it was thick, it was always in a state of unrest—contracting and retracting and also there was always a certain amount of hæmorrhage that could not be controlled. In the suturing of the wound one left the mucous membrane alone with the result that a little gutter was left which healed by granulation and which was liable to become septic. The ligature in the uterine wound had to be drawn tighter than in other wounds as it had not only to bring the edges accurately together but it had also to stop the hæmorrhage.

He thought the lower uterine segment was the better part to incise in performing Cæsarean section because it was always at rest and the hæmorrhage was never so great as in the upper segment.

Dr. David Shannon favoured craniotomy in cases that were suspicious. He always performed it on a patient admitted to hospital with a history of having been in the second stage of labour for many hours, where forceps had failed, and where numerous vaginal examinations had been made. In such cases he thought the cervix was the infected area, and it was better for the mother, in his opinion, to do a craniotomy than a Cæsarean section followed by a subtotal hysterectomy. Regarding suture material for the uterine wound he had in his own cases used both silk and catgut, but he was of the opinion that it was of no consequence which was used. The strength of the wound depended not on the ligature, but on the fact whether the wound became septic or not. Douching of the uterus before operation, he thought, was not a wise procedure.

Dr. Dickie said the uterine wound was identical in its healing with all other wounds. The fault was not in the uterus but in the imperfect technique employed. Suture material he thought was of some moment. He thought the uterine sutures were too tightly tied. Less tension would be followed by less aseptic necrosis. He thought no surgeon would have rupture of the uterus in his aseptic cases.

Dr. James Craig said he was greatly interested in the Cæsarean operation and in the procuring of a perfect scar so that the operation might be repeated again and again. He was doubtful whether it was possible to get a perfect healing wound in the uterus.

Dr. Duff thought intrauterine irrigation was distinctly unsurgical. In douching such a case, infection would be carried from the infected cervix and the child's head

into the uterus. No difficulty should be experienced in stitching the uterine wound in layers, and he was strongly of the opinion that the sutures should not be tied too tight, as necrosis was liable to take place.

Dr. Louise McIlroy said that the practice of douching the amniotic cavity for the prevention of subsequent sepsis was a dangerous proceeding as the fluid was a means of disseminating sepsis through the cavity. Antiseptic fluid, she said, unless strong enough to kill the tissues was useless as a douching agent.

The President said that Dr. Kerr had discussed the question of operative technique in Cæsarean section in an academic spirit. Many things suggested themselves to his mind as he listened to the paper. He had repeatedly performed the operation for the second time on the same patient, but on no occasion had he seen any sign of weakening of the wound. He was still satisfied with chromicised catgut and had never used silk or silkworm gut. It was important to cover the wound with peritoneum. He thought the security of the wound depended not so much on its situation or on the nature of the material used as upon the thoroughness of the asepsis. Irrigation of the uterine cavity was not always possible, but it was a suggestion that should be kept in mind. Dr. Russell in a few words related his technique in extraperitoneal Cæsarean section and was of the opinion that the operation had its place alongside the classical Cæsarean sectio.n.

Dr. Kerr replied.

REVIEWS OF RECENT BOOKS.

DER HAFTAPPARAT DER WEIBLICHEN GENITALEN: EINE ANATOMISCHE STUDIE. Von Dr. Eduard Martin. 1 Teil. Beckenbindegewebe, Faszien- und Muskelapparat. Mit 16 Tafeln. Berlin 1911: S. Karger. Text 66 pages.

Impressed with the difficulties which invest the subject of Prolapse, and believing these to depend on the relatively small attention which has been paid to the anatomy of the pelvis, Dr. Eduard Martin has attempted to remedy this state of things by individual study and research into the means whereby the female pelvic viscera are maintained in their normal position. The title of his book, "The Suspensory Apparatus", gives us the clue to his conclusions.

The text is divided into three parts. In the first, the various opinions of workers in this field—anatomists and gynæcologists—are cited, which shows up very clearly the non-uniformity of the descriptions and of the nomenclature of the parts. Here we have sections dealing with the pelvic floor musculature and the urogenital diaphragm, the pelvic fascia, the pelvic (visceral) connective tissue, and the means of attachment of the viscera whereby they are maintained in their normal position. In the second part, the 16 plates are described, and the several anatomical structures pointed out. In the last part, the author gives a critical review and his conclusions, so that here all the structures are dealt with again. Thus, the method involves a good deal of repetition, which at times seems more to weary than to impress the reader.

Many points raised are good; especially so is the clear division of the fascial sheets enveloping the muscles—the pelvic fascia—from the thickenings of the connective tissue in which the viscera are embedded. These latter, the several parts of which have been described as the pubo-vesical ligaments, the cardinal ligaments, and the utero-sacral ligaments, are collectively considered as a whole, called the retinaculum uteri. Since the strands comprising it centrally invest the cervix uteri and the adjacent part of the vagina, and are here thickest and densest, whilst peripherally they become frayed out and looser and form a meshwork containing fat cells, it is concluded that these thickenings begin in the region of the cervix, which is to be regarded as their origin, and that they pass outwards towards the pelvic walls. This retinaculum uteri is not present at birth, but only arises gradually with growth, reaching full development at puberty. That this connective tissue maintains the viscera in their normal position—especially the uterus, which is poised in the pelvis by means of these suspensory strands—is shown by the fact that when the cervix is pulled downwards and then let go, it returns to its original position, even when the pelvic floor is held out of the way by means of a speculum. The occurrence of prolapse in nulliparæ, in whom the perineum and pelvic floor are of course uninjured, can only be explained by an insufficiency in the tonus of this pelvic connective tissue. Moreover, in prolapse this tissue is found to be atrophied, a condition which must be associated with the prolapse. And the loosening which occurs in pregnancy may be dismissed, since it is physiological!—an odd sort of reasoning. How are the pelvic viscera supported during pregnancy if the suspensory apparatus disappears? Taken in conjunction with the hypertrophy of the pelvic floor musculature, this disappearance is full of significance: but the author does not refer to this point.

The pelvic floor musculature does not support the uterus from below, as Halban and Tandler have insisted, because the uterus does not rest on this floor, does not even touch it. This musculature forms a ring-like gliding surface, and may be described as funnel-shaped, if the anterior third of the funnel be removed. The pyriformis muscle forms part of the floor—at least it helps to line the bony pelvis. The levator ani arises in many cases from the ilio-pectineal line by fascia, which represents the upper degenerated part of the levator ani, and this has become incorporated with the fascia lining the obturator internus muscle from which it cannot be separated—a contradiction to the finding of Prof. Peter Thompson, who by dissection was able easily to separate these two layers; but Prof. Thompson's work is not referred to, and his monograph on the pelvic floor is not mentioned in the literature. The anterior free border of the muscle passes obliquely to the middle of the pelvic floor, mainly to behind the rectum, and ends directly in the external sphincter ani muscle. A few fibres pass to the anterior rectal wall, and to the perineal body—described as a thick fibrous mass! The muscle for the most part forms a sling behind the rectum; but the fibres of one side do not run into those of the other, but cross and then fray out into those of the external sphincter—a condition contrary to that the reviewer found on dissection. This median border of the levator ani forming the cleft in the levator does not touch the vagina laterally (p. 58), nor is the muscle felt from the vagina in nulliparæ, but what is perceived is the urogenital diaphragm! That a hardening of this "palpable ring" occurs with voluntary contraction of the entire pelvic floor musculature, including the external sphincter ani etc., only shows the presence of striated muscle tissue, and this is *always* present in the urogenital diaphragm.

The function of the levator ani is shown by its phylogeny. Kollmann and Lartschneider have demonstrated that the levator ani is a purely skeletal muscle, a lateral flexor of the tail; and as the tail has diminished so has the muscle atrophied—thus the part arising from the ilio-pectinal line has disappeared. Lartschneider's opinion that part of the levator ani (pars iliaca) has been developed from the musculature of the vertebral column, whilst the other part (pars pubica), in common with the external sphincter ani and other superficial muscles, has been developed from the great skin muscle is considered of very great importance. For the iliac portion having partially degenerated, it is the pubic portion which functions most in man and it acts similarly to the muscles with which it has a common origin. The function of the levator ani in man is to raise the rectum towards the symphysis, acting as a sphincter; and thus is explained the control patients possess over the bowel when the sphincter is torn through, even to the extent of retaining liquid fæces and gas! When this is not possible, it is an indication that the borders of the levator ani of one or both sides have been involved in the tear. It is, however, clear the author has not paid much attention to this question of phylogeny; otherwise he would have been struck by the significant existence of the levator ani and coccygei muscles in some animals without tails, and the equally significant non-existence of the levator ani in some animals which possess long and mobile—even laterally mobile—tails, such as the horse and ox. That the pars pubica of the levator ani did not arise from the great skin muscle, but from the trunk musculature, is clear from the conditions found in the fish, amphibia and reptiles, for its precursor is distinct at a time when a ring muscle encircling the cloaca (sphincter muscle) cannot be displayed; whilst the conditions in mammals points to the iliac portion being derived from the pubic portion itself as a dorsal extension, *i.e*, along the iliac bones towards the vertebral column—an origin which explains the close relation of the two parts of the levator ani to each other—and that it did not appear separately as Lartschneider has stated.

The pelvic floor indeed plays a part in maintaining the viscera in position: but no reason why it is assumed to do so appears. Halban and Tandler's opinion that the levator ani is capable of resisting the intraabdominal pressure and that by so doing

it maintains the viscera within the pelvis, is quoted to be refuted, in that the pelvic floor musculature is not the chief support of the viscera; but in denying so extensive a work to the pelvic floor as these authors impute to it, the author of the book before us leaves the pressure conditions prevailing within the body cavity severely alone, for he omits any mention of them. Although the pelvic floor undoubtedly plays some minor part in maintaining the viscera in position this is not comparable to the part played by the suspensory apparatus, *i.e.*, the various thickenings of the pelvic visceral connective tissue—retinaculum uteri—as clinical observation demonstrates (*e.g.*, the pulling down of the cervix and then letting go and the absence of prolapse in some cases of complete tear of the perineal body): but such as this is, it is due more to the fascial layers enveloping the musculature—the pelvic fascia within and the fascia related to the urogenital diaphragm without—than to the actual muscular tissue. Does not the prevention of ventral hernia after abdominal operation depend on the exact suturing of the fascial layers? Thus the living muscle cell, remarkable for its metabolism, plays a rôle subordinate to fibrous strands, the metabolic changes in which are inconspicuous and negligible, and which are indeed extracellular deposits of connective tissue cells. In the case of the suturing of the fascial layers of the abdominal wall, we may remind the author that though these medianly form a sheath, imperfect below for the recti muscles, yet they are the continuations of the flank muscles and in quite a different category to fascial sheaths enveloping muscles, *e.g.*, the pelvic fascia.

Such is the argument in this book; the conclusion come to by the author is the only consequence. We have already indicated here and there the unsoundness of the former; unfortunately the premises are also incomplete. Anatomy alone cannot teach one the significance of living cells, nor can we judge by its light the forces living cells exert. And the object of this book is based mainly on anatomy; a few clinical, *i.e.*, physiological, observations are quoted, but they are few and far between, and some are inaccurate. As an anatomical study the book on the whole is good and may be confidently recommended from this point of view; it is well published, contains but few misprints, and the plates are large and clear and so arranged that they may be viewed as the text is read without any troublesome turning over of leaves. But as a work throwing light on the factors concerned in the maintenance of the pelvic viscera in their normal position the book appears to the reviewer unsound.

R. H. P.